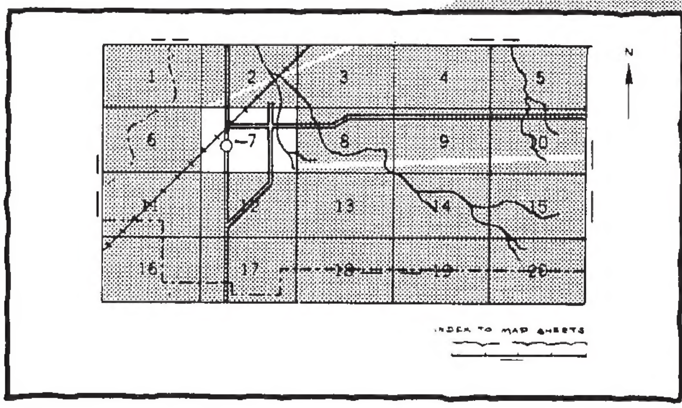
SOIL SURVEY OF

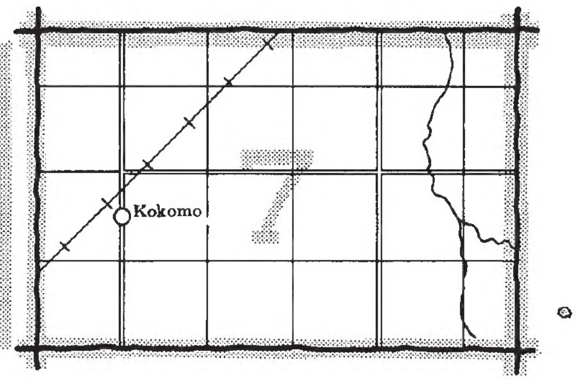
AUGUSTA COUNTY, VIRGINIA

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE and FOREST SERVICE
in cooperation with the
VIRGINIA POLYTECHNIC INSTITUTE and STATE UNIVERSITY

HOW TO USE

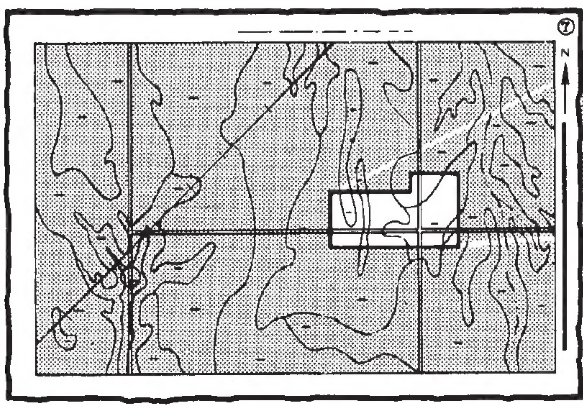
1. Locate your area of interest on the "Index to Map Sheets" (the last page of this publication).

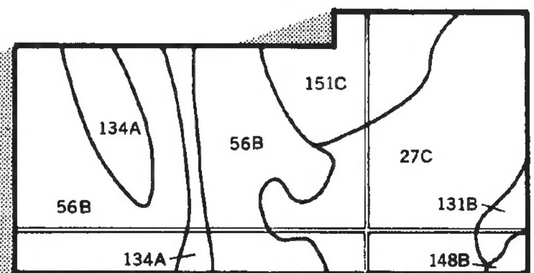




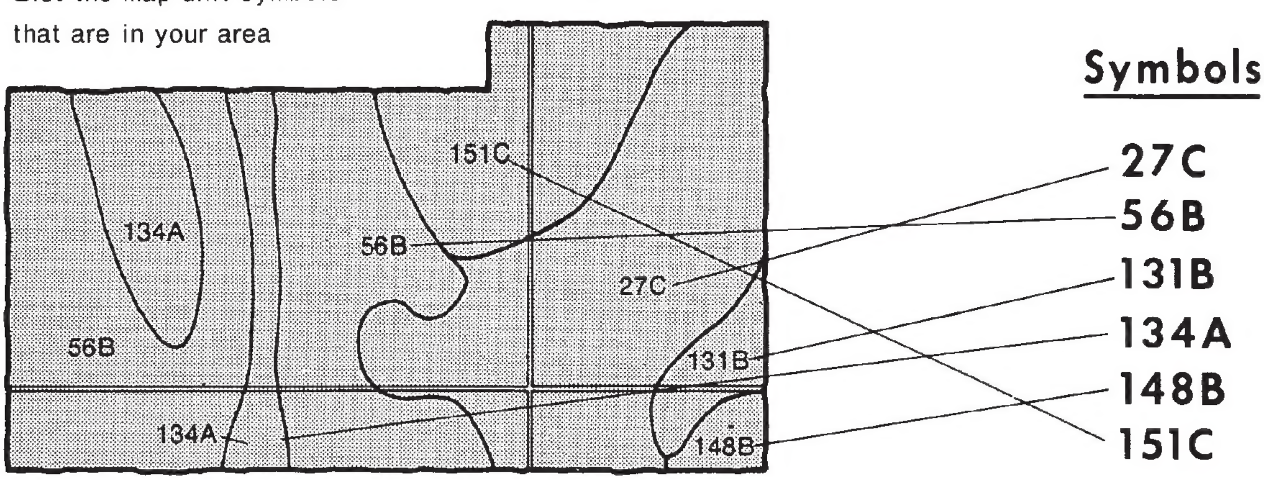
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



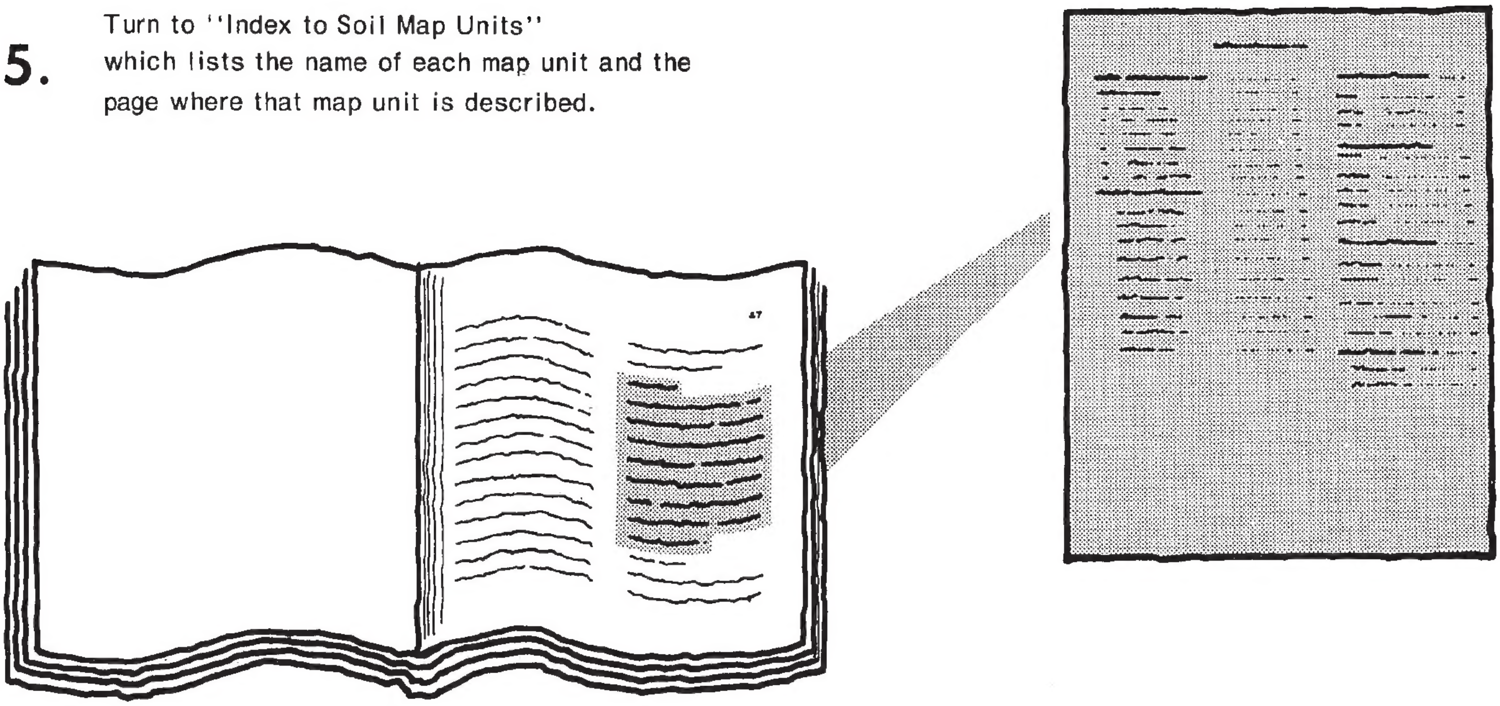


4. List the map unit symbols that are in your area

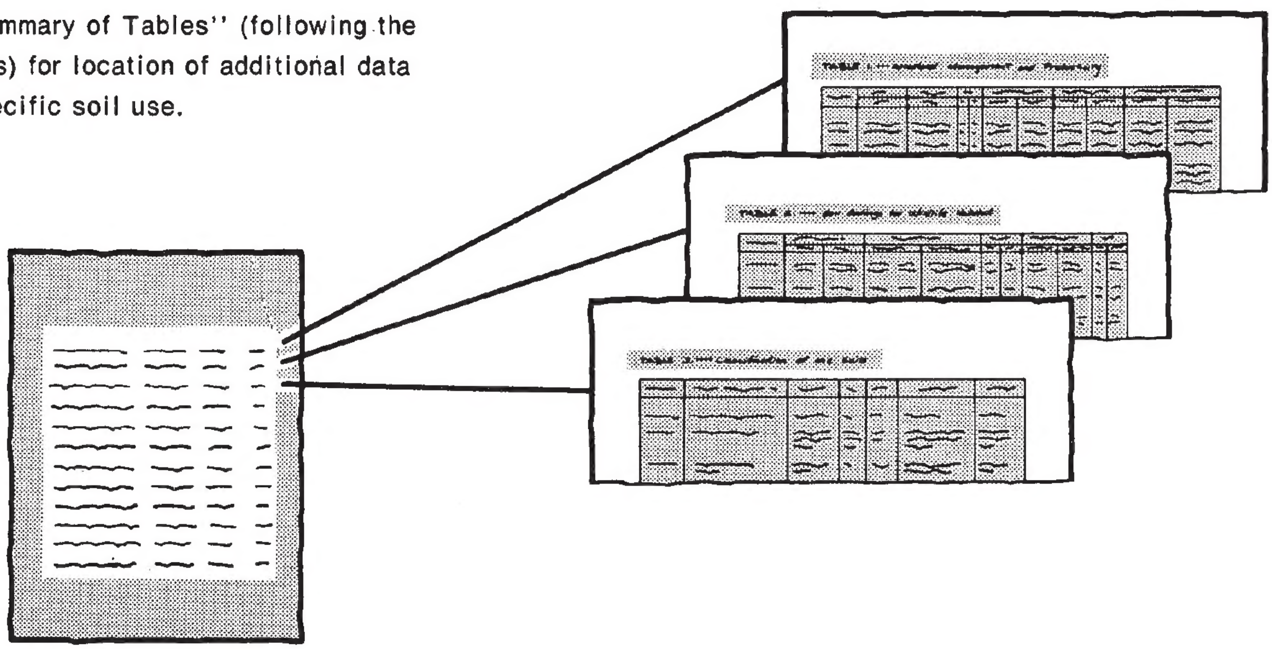


THIS SOIL SURVEY

5. Turn to ''Index to Soil Map Units'' which lists the name of each map unit and the page where that map unit is described.



6. See ''Summary of Tables'' (following the Contents) for location of additional data on a specific soil use.



7. Consult ''Contents'' for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; for specialists in wildlife management, waste disposal, or pollution control.

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in the period 1963-68. Soil names and descriptions were approved in 1977. Unless otherwise indicated, statements in the publication refer to conditions in the survey area in 1977. This survey was made cooperatively by the Soil Conservation Service, the Forest Service, and the Virginia Polytechnic Institute and State University. It is part of the technical assistance furnished to the Headwaters Soil and Water Conservation District.

Soil maps in this survey may be copied without permission, but any enlargement of these maps can cause misunderstanding of the detail of mapping and result in erroneous interpretations. Enlarged maps do not show small areas of contrasting soils that could have been shown at a larger mapping scale.

Cover: Contour stripcropping on an area of Timberville silt loam, 0 to 7 percent slopes.

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Issued January 1979

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Summary of tables

Foreword

The Soil Survey of Augusta County, Virginia, contains much information useful in any land-planning program. Of prime importance are the predictions of soil behavior for selected land uses. Also highlighted are limitations or hazards to land uses that are inherent in the soil, improvements needed to overcome these limitations, and the impact that selected land uses will have on the environment.

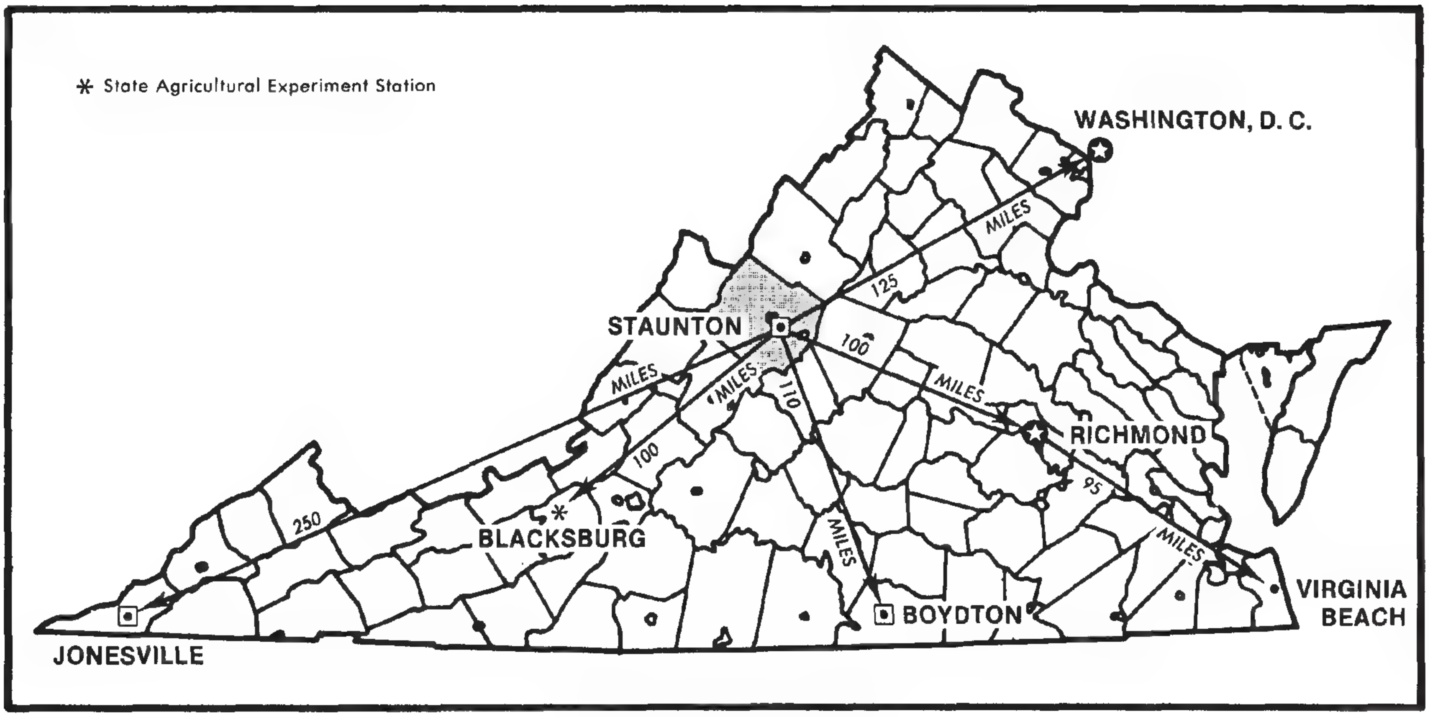
This soil survey has been prepared for many different users. Farmers, foresters, and agronomists can use it to determine the potential of the soil and the management practices required for food and fiber production. Planners, community officials, engineers, developers, builders, and homebuyers can use it to plan land use, select sites for construction, develop soil resources, or identify any special practices that may be needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the soil survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur even within short distances. Soils may be seasonally wet or subject to flooding. They may be shallow to bedrock. They may be too unstable to be used as a foundation for buildings or roads. Very clayey or wet soils are poorly suited to septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map; the location of each kind of soil is shown on detailed soil maps. Each kind of soil in the survey area is described, and much information is given about each soil for specific uses. Additional information or assistance in using this publication can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

This soil survey can be useful in the conservation, development, and productive use of soil, water, and other resources.

David N. Grimwood
State Conservationist
Soil Conservation Service



Location of Augusta County in Virginia.

SOIL SURVEY OF AUGUSTA COUNTY, VIRGINIA

By John R. Hockman, Joseph C. McKinney, Thomas R. Burruss, David Jones, and Robert E. Modesitt, Soil Conservation Service, and Lewis G. Manhart and William R. Waite, Jr., Forest Service

United States Department of Agriculture, Soil Conservation Service and Forest Service, in cooperation with the Virginia Polytechnic Institute and State University

AUGUSTA COUNTY is the second largest county in Virginia and has an area of 986 square miles, or 631, 040 acres. The county is in the northwestern part of the State, 150 miles southwest of Washington, D. C., and 100 miles northwest of Richmond, the State capital.

The general relief of Augusta County is that of a broad, rolling valley flanked on the east by the Blue Ridge Mountains and on the west by the Appalachian Mountains, which rise abruptly above the level of the valley floor. The northern two-thirds of the county is in the Potomac River Watershed, and the southern third is in the James River Watershed. Water is available in the county from impoundments on the North and South Rivers and from wells and springs throughout the county.

The soils in the county are of many different kinds and formed in material weathered from shale, limestone, sandstone, quartzite, basaltic lava, and conglomerate. Most of the soils, with the exception of those on the steeper ridges and mountain slopes, are suited to a wide variety of farm and nonfarm uses.

Forests make up approximately 44 percent of the county and are confined mainly to the steeper slopes. Oak-hickory is the dominant forest type.

Approximately 32 percent of the county is publicly owned. The mountainous areas in the western and southeastern parts of the county are in the George Washington National Forest, and the Shenandoah National Park extends into the mountains in the northeastern part of the county. Skyline Drive winds through Shenandoah National Park and connects with the Blue Ridge Parkway at Rockfish Gap.

Climate and fertile soils make the county a leader in the State in the raising of livestock and poultry and in general farming. The principal sources of farm income, according to the U. S. Census of Agriculture in 1974, were livestock and livestock products, poultry and poultry products, dairy products, field crops, fruits and nuts, and nursery and greenhouse products.

Industry not related to agriculture has grown in the county since 1950 and employs a larger percentage of the work force than agriculturally related activities. Manufacturing is diversified and well distributed throughout the county.

Excellent hunting and fishing in the Blue Ridge and Appalachian Mountains attracts large numbers of sportsmen each year. Attractive recreation areas such as Sherando Lake, Todd Lake, and Shenandoah Acres are used by vacationers during the summer months.

Augusta County is rapidly becoming urbanized and industrialized, especially in the areas near the cities of Staunton and Waynesboro and the community of Verona. This rapid expansion of residential and industrial development has increased the need for adequate water supplies; streets, roads, and highways; schools, shopping centers, and recreational areas; and methods of waste disposal.

General nature of the county

This section discusses the history and population of Augusta County and describes the climate and the transportation facilities in the county.

History and population

Some of the data for this section were obtained from the Data Summary of the Virginia Division of Industrial Development and Planning.

Augusta County was formed from Orange County in 1738, but the county government was not established until 1745. The county was named for Augusta, Princess of Wales and mother of George III. Since the establishment of the county, portions of its area have been used to form the neighboring counties of Rockbridge and Frederick.

The 1970 population of Augusta County was 44,220, and the 1971 population estimate prepared by the Bureau of Population and Economic Research of the University of Virginia was 44,918. The Division of State Planning and

Community Affairs projects that the Augusta County population will reach 51,000 by 1980.

The independent cities of Staunton and Waynesboro are wholly within the Augusta County boundaries. Staunton, named for Lady Rebecca Staunton, the wife of Governor Sir William Gooch, was established as a town in 1761 and incorporated as a city in 1871. Waynesboro was established as a town in 1801 and incorporated as a city in 1948. It was named for General Anthony Wayne, an American commander during the Revolutionary War.

Of special historic interest in Staunton is the Woodrow Wilson Birthplace. The building was completed in 1847 and was used as the manse for the First Presbyterian Church, where Reverend Joseph Wilson was pastor from 1855 to 1857. His son, the twenty-eighth President of the United States, was born on December 28, 1856.

Climate

Winters are cold and snowy at high elevations in Augusta County. In valleys it is also frequently cold, but intermittent thaws preclude a long-lasting snow cover. Summers are fairly warm on mountain slopes and very warm with occasional very hot days in the valleys. Rainfall is evenly distributed during the year, but it is appreciably heavier on the windward, west-facing slopes than in the valleys. Normal annual precipitation is adequate for all crops, although summer temperature and growing season length, particularly at higher elevations, may be inadequate.

Table 1 gives data on temperature and precipitation for the survey area, as recorded at Dale Enterprise, Virginia, for the period 1951 to 1975. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 34 degrees F, and the average daily minimum temperature is 24 degrees. The lowest temperature on record, which occurred at Dale Enterprise on January 28, 1961, is -12 degrees. In summer the average temperature is 72 degrees, and the average daily maximum temperature is 84 degrees. The highest recorded temperature, which occurred on July 3, 1966, is 100 degrees.

Growing degree days, shown in table 1, are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Of the total annual precipitation, 20 inches, or 60 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 16 inches. The heaviest 1-day rainfall during the period of record was 4.70 inches at Dale Enterprise on October 15, 1954. Thunderstorms occur on about 40 days each year, and most occur in summer.

Average seasonal snowfall is 28 inches. The greatest snow depth at any one time during the period of record was 24 inches. On the average, 13 days have at least 1 inch of snow on the ground, but the number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 50 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The percentage of possible sunshine is 60 in summer and 50 in winter. The prevailing wind is from the southeast. Average windspeed is highest, 10 miles per hour, in spring.

Heavy rains, which occur at any time of the year, and severe thunderstorms in summer sometimes cause flash flooding, particularly in narrow valleys.

Climatic data in this section were specially prepared for the Soil Conservation Service by the National Climatic Center, Asheville, North Carolina.

Transportation

Interstate highways 64 and 81 and U.S. routes 11, 250, and 340 are the major automotive routes in Augusta County. Commercial bus service is available, with daily schedules to major cities in Virginia and to Washington, D. C. Interstate and local carriers provide motor freight transportation service to the county, and three airports and several rail lines offer passenger and freight service.

How this survey was made

Soil scientists made this survey to learn what kinds of soil are in the survey area, where they are, and how they can be used. The soil scientists went into the area knowing they likely would locate many soils they already knew something about and perhaps identify some they had never seen before. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; the kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A *profile* is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material, which has been changed very little by leaching or by the action of plant roots.

The soil scientists recorded the characteristics of the profiles they studied, and they compared those profiles with others in counties nearby and in places more distant. Thus, through correlation, they classified and named the soils according to nationwide, uniform procedures.

After a guide for classifying and naming the soils was worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, roads, and other details that help in drawing boundaries accurately. The

soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called soil map units. Some map units are made up of one kind of soil, others are made up of two or more kinds of soil, and a few have little or no soil material at all. Map units are discussed in the sections "General soil map for broad land use planning" and "Soil maps for detailed planning."

While a soil survey is in progress, samples of soils are taken as needed for laboratory measurements and for engineering tests. The soils are field tested, and interpretations of their behavior are modified as necessary during the course of the survey. New interpretations are added to meet local needs, mainly through field observations of different kinds of soil in different uses under different levels of management. Also, data are assembled from other sources, such as test results, records, field experience, and information available from state and local specialists. For example, data on crop yields under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it is readily available to different groups of users, among them farmers, managers of rangeland and woodland, engineers, planners, developers and builders, homebuyers, and those seeking recreation.

General soil map for broad land use planning

The general soil map at the back of this publication shows, in color, map units that have a distinct pattern of soils and of relief and drainage. Each map unit is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map provides a broad perspective of the soils and landscapes in the survey area. It provides a basis for comparing the potential of large areas for general kinds of land use. Areas that are, for the most part, suited to certain kinds of farming or to other land uses can be identified on the map. Likewise, areas of soils having properties that are distinctly unfavorable for certain land uses can be located.

Because of its small scale, the map does not show the kind of soil at a specific site. Thus, it is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The kinds of soil in any one map unit differ from place to place in slope, depth, stoniness, drainage, or other characteristics that affect their management.

Soils in the main valley formed in residuum of interbedded limestone, dolomite, and calcareous shale

1. Frederick-Christian-Rock outcrop

Deep, well drained soils that have a subsoil of clay loam to clay; and areas of Rock outcrop; all on limestone uplands

Areas of these gently sloping to steep soils are extensive throughout the limestone valley section of the county. The areas are gently undulating to very hilly.

This unit makes up about 20 percent of the county. The unit is about 45 percent Frederick soils, 30 percent Christian soils, 13 percent Rock outcrop, and 12 percent soils of minor extent.

The Frederick and Christian soils are mainly gently sloping and sloping. Both soils have a surface layer of silt loam or fine sandy loam, and both have noncherty, cherty, nonrocky, and rocky areas. Rock outcrop consists of limestone outcrops mainly less than 30 feet apart and is mainly on the steeper areas.

The soils of minor extent are well drained Elliber, Endcav, Shenval, and Timberville soils and Udifluvents; moderately well drained Nixa soils; and somewhat poorly drained to poorly drained Fluvaquents.

This unit is used mainly for crops and pasture. The noncherty and nonrocky areas are mostly in cultivated crops. The steeper soils and the rocky and cherty areas are mainly in hay, pasture, or woodland. Erosion, rockiness, coarse fragments, and steep slopes are the main limitations of these soils for farming. A clayey subsoil, shallow depth to bedrock, and steep slopes are the main limitations for urban development and most other uses.

This unit has good potential for cultivated crops and for pasture and hay. The steeper areas and the rocky and cherty areas have good potential for grasses or woodland.

2. Frederick-Bookwood-Christian

Deep to moderately deep, well drained soils that have a subsoil of clay loam to clay or gravelly loam to gravelly clay loam; on limestone uplands

Areas of these gently sloping to steep soils are extensive in the main valley section of the county. The areas are gently undulating to very hilly.

This unit makes up about 12 percent of the county. The unit is about 67 percent Frederick soils, 12 percent Bookwood soils, 8 percent Christian soils, and 13 percent soils of minor extent.

The Frederick, Bookwood and Christian soils are throughout this unit. The Frederick soils are very deep, the Bookwood soils are moderately deep, and the Christian soils are deep. All of these soils have a surface layer of silt loam or fine sandy loam. The Frederick and Christian soils have noncherty, cherty, nonrocky, and rocky areas

and have a clayey subsoil; the Bookwood soils have a loamy subsoil.

The minor soils in this unit are moderately well drained Udifluvents and Timberville soils, moderately well drained Nixa soils, and somewhat poorly drained to poorly drained Fluvaquents. Also included are scattered sinkholes and rock outcrops.

This unit is used mainly for cultivated crops and pasture. The noncherty and nonrocky areas are used mainly for cultivated crops, hay, or pasture. The steeper soils and the cherty and rocky areas are mainly used for hay, pasture, or woodland. Erosion, coarse fragments, rockiness, and steep slopes are the main limitations for farming. A clayey subsoil, moderate depth to bedrock in places, and steep slopes are the main limitations for urbanization and other uses.

The smoother slopes of this unit have good potential for cultivated crops and for pasture and woodland. The steeper soils and the cherty and rocky areas have good potential for hay, pasture, or woodland.

3. Chilhowie-Edom

Moderately deep to deep, well drained soils that have a dominantly clayey subsoil; on limestone uplands

Areas of these gently sloping to steep soils are throughout the main valley section of the county. The largest areas are adjacent to and east of U.S. highway 11 and adjacent to and west of State route 608. The areas of this unit are gently undulating to very hilly.

This unit makes up about 6 percent of the county. The unit is about 40 percent Chilhowie soils, 30 percent Edom soils, and 30 percent soils of minor extent.

The Chilhowie soils generally are on narrow ridgetops and short, steep side slopes. Chilhowie soils are moderately deep and have a surface layer of silty clay loam or shaly silty clay loam. The Edom soils are mainly on the longer, gently rolling to rolling areas and on broad ridgetops. Edom soils are deep and have a surface layer of silt loam or silty clay loam.

The minor soils in this unit are well drained Endcav soils, moderately well drained Guernsey soils, and poorly drained Aqualfs and Fluvaquents and intermingled areas of Rock outcrop.

This unit is used mainly for crops and pasture. The deeper, more gently sloping soils are used for cultivated crops. The steeper, shallower soils are mainly used for hay and pasture. Most of the steep, rocky, or rough areas are in woodland. Erosion, rockiness, moderate depth to bedrock, and steep slopes are the main limitations for farming and urban, recreational, or other uses.

This unit has fair to good potential for cultivated farm crops. It has poor potential for urbanization and other uses mainly because of moderate depth to bedrock and a clayey subsoil. The potential for woodland is fair to good.

Soils in the main valley formed in residuum of shale and thin interbedded sandstone and limestone

4. Berks-Weikert-Sequoia

Shallow to deep, well drained soils that have a subsoil of shaly silt loam, shaly loam, or clay; on shale uplands

Areas of these gently sloping to steep soils are in the main valley section of the county. The largest area is east of and parallel to U.S. highway 11. The areas are gently undulating to very hilly.

This unit makes up about 5 percent of the county. The unit is about 52 percent Berks soils, 25 percent Weikert soils, 8 percent Sequoia soils, and 15 percent soils of minor extent.

The Berks soils are moderately deep and are on narrow to moderately wide ridgetops and side slopes. The Weikert soils are shallow and are on the noses and short, steep side slopes of ridges. The Sequoia soils are moderately deep and clayey and are on the more nearly level areas of moderately wide to wide ridgetops. All of these soils have a surface layer of silt loam or shaly silt loam.

The minor soils in this unit are moderately well drained Udifluvents; Udorthents, shaly, and Chilhowie soils; moderately well drained Guernsey soils; poorly drained Fluvaquents and Aquents, loamy-skeletal; and areas of shale outcrop and very shaly, shallow soils.

This unit is used mainly for pasture, but some areas are used for cultivated crops or are in woodland. Droughtiness, shallow to moderate depth to shale bedrock, erosion, and steep slopes are the main limitations for farming. Shallow to moderate depth to bedrock and moderately slow to rapid permeability are the main limitations for most urban uses.

This unit has fair to poor potential for cultivated farm crops, depending on steepness of slope and depth to shale bedrock. The potential for most urban uses is poor. The potential for woodland is fair.

Soils on the Appalachian and Blue Ridge Mountains formed in residuum of sandstone, shale, and greenstone

5. Berks-Weikert-Rushtown

Shallow to deep, well drained soils that have a subsoil of shaly silt loam or shaly loam; on steep mountainous uplands

These moderately steep to steep soils are in large areas throughout the George Washington National Forest. The soils are on mountainsides and mountaintops.

This unit makes up about 11 percent of the county. The unit is about 76 percent Berks soils, 10 percent Weikert soils, 6 percent Rushtown soils, and 8 percent soils of minor extent.

The Berks soils are on convex mountainsides and undulating ridges. The Weikert soils are on very steep, convex, south-facing slopes. The Rushtown soils are on steep, concave, north-facing slopes and coves. The Berks soils are moderately deep and have a surface layer of channery silt loam. The Weikert soils are shallow and have a surface layer of very shaly silt loam. The Rushtown soils are deep and have a surface layer of shaly silt loam. All of these soils are droughty.

The minor soils in this unit are well drained Hazleton and Lehew soils.

This unit is used mainly for woodland. A few small areas are cleared and used for pasture. Steep slopes, coarse fragments, and shallow to moderate depth to bedrock are the main limitations for farming and urban and recreational uses.

This unit has poor potential for cultivated farm crops. The potential for urbanization is poor. The potential for woodland is fair to poor.

6. Hazleton

Deep, well drained soils that have a subsoil of channery sandy loam; on mountainous uplands

These sloping to very steep soils are on the west-facing slopes of the Blue Ridge Mountains and on Walker Mountain. The soils are on rolling to very steep mountainsides and mountaintops.

This unit makes up about 6 percent of the county. The unit is about 75 percent Hazleton soils and 25 percent soils of minor extent.

The Hazleton soils have a surface layer of sandy loam, fine sandy loam, or loam, and some areas are stony, very stony, extremely stony, or bouldery.

The minor soils in this unit are excessively drained Cataska and Drall soils; well drained to excessively drained Udorthents and Sherando soils; well drained Hartleton, Unison, Jefferson, and Elliber soils; and moderately well drained Monongahela soils.

This unit is mostly wooded. A small acreage is used for pasture. Boulders, stones, and steep slopes are the main limitations for farming and other uses.

This unit has poor potential for farming and for residential and other urban uses.

7. Lew-Cataska-Hartleton

Deep to moderately deep, excessively drained to well drained soils that have a channery or slaty subsoil; on mountainous uplands

Areas of these sloping to very steep soils are in the Blue Ridge Mountains along the eastern border of the county. The areas are on rolling to very steep mountainsides and mountaintops.

This unit makes up about 6 percent of the county. The unit is about 28 percent Lew soils, 27 percent Cataska soils, 26 percent Hartleton soils, and 19 percent soils of minor extent.

The Lew soils are mostly on upper side slopes of mountains. The Cataska and Hartleton soils are on mountainsides generally below Lew soils. The Lew and Hartleton soils are well drained; the Cataska soils are excessively drained. The soils in this unit have a surface layer of silt loam, slaty silt loam, or channery loam. Some areas are very stony or bouldery.

The minor soils in this unit are well drained Hazleton and Unison soils and Rubble land.

This unit is mostly wooded. Boulders, stones, and steep slopes are the main limitations for farming and other uses.

This unit has poor potential for farming and most other uses.

8. Monongahela-Berks-Weikert

Deep to shallow, well drained to moderately well drained soils that have a dense, compact subsoil or a subsoil of shaly silt loam; on mountainsides and terraces

Areas of these gently sloping to steep soils are in the Appalachian Mountains. The soils are on gently undulating to steep mountain foot slopes and side slopes and terraces.

This unit makes up about 3 percent of the county. The unit is about 40 percent Monongahela soils, 37 percent Berks soils, 10 percent Weikert soils, and 13 percent soils of minor extent.

The Monongahela soils are on mountain foot slopes and colluvial fans. The Berks and Weikert soils are on higher mountainsides and crests generally above Monongahela soils. The Monongahela soils are deep but have a fragipan that inhibits downward movement of water. They are moderately well drained. The Berks soils are moderately deep and the Weikert soils are shallow. Both are well drained and droughty.

The minor soils in this unit are well drained Hazleton and Jefferson soils and moderately well drained Ernest soils.

This unit is mostly wooded. A small acreage is used for pasture and crops. Shallow to moderate depth to bedrock, droughtiness, coarse fragments, and steep slopes are the main limitations for farming. Shallow to moderate depth to bedrock, coarse fragments, and steep slopes are the main limitations for urbanization and other uses.

The Monongahela and Berks soils have fair potential for cultivated crops and for hay and pasture. The Weikert soils have a poor potential for farm crops or pasture. This unit has poor potential for urban uses.

9. Drall-Hazleton-Leetonia

Deep, well drained to excessively drained soils that have a very channery or gravelly subsoil; on mountainous uplands

Areas of these sloping to very steep soils are on the west-facing slopes of the Blue Ridge Mountains and on the higher slopes of the Appalachian Mountains. The soils are on rolling to very steep mountaintops and side slopes.

This unit makes up about 5 percent of the county. The unit is about 55 percent Drall soils, 30 percent Hazleton soils, 8 percent Leetonia soils, and 7 percent soils of minor extent.

The Drall and Leetonia soils are at the highest elevations along the top and upper side slopes of the mountains. The Hazleton soils are on mountainsides generally below the Drall and Leetonia soils. The soils of this unit have a surface layer of sandy loam, fine sandy loam, or loamy sand. All are deep but are stony, very stony, or extremely stony. Some areas have rock escarpments.

The minor soils in this unit are well drained to excessively drained Lehew soils, well drained Berks and Weikert soils, and Rubble land.

This unit is mostly wooded. A few small areas are used for pasture. Steep slopes, stoniness, and droughtiness are the main limitations for farming and other uses.

This unit has poor potential for farming and other uses.

10. Lehew-Hazleton

Moderately deep to deep, well drained to excessively drained soils that have a channery or very channery subsoil; on mountainous uplands

Areas of these sloping to very steep soils are on the Appalachian Mountains. The soils are on rolling to very steep mountaintops and side slopes.

This unit makes up about 10 percent of the county. The unit is about 46 percent Lehew soils, 30 percent Hazleton soils, and 24 percent soils of minor extent.

The Lehew soils generally are on broad mountaintops and upper side slopes. The Hazleton soils are mainly on side slopes and in coves below Lehew soils. The soils of this unit have a surface layer of sandy loam, fine sandy loam, or flaggy fine sandy loam. Some areas are rocky, stony, very stony, or extremely stony.

The minor soils in this unit are excessively drained Drall soils and well drained Berks and Weikert soils.

This unit is mostly wooded. A few small nonstony areas on the smoother slopes along the tops of the mountains are used for pasture. Rock outcrops, stones, and steep slopes are the main limitations for farming or urban purposes.

This unit has poor potential for farming and for urban, recreational, or other uses.

Soils on flood plains, terraces, and mountain foot slopes formed in alluvial or colluvial material

11. Buchanan-Wheeling-Buckton

Deep, somewhat poorly drained to well drained soils that have a dense, compact subsoil or a subsoil of silt loam, loam, or clay loam; on stream terraces and flood plains

Areas of these nearly level to gently sloping soils are mostly along Jennings Branch and Middle River in the west-central and northeastern parts of the limestone valley. The soils are on nearly level to gently rolling terraces and flood plains.

This unit makes up about 3 percent of the county. The unit is about 50 percent Buchanan soils, 22 percent Wheeling soils, 10 percent Buckton soils, and 18 percent soils of minor extent.

The Buchanan soils are somewhat poorly drained. They have a fragipan that inhibits the downward movement of water. The Wheeling soils are well drained, and they are rarely flooded. Both soils are on terraces. The Buckton soils are well drained. They are on flood plains and are occasionally flooded. In most areas of this unit the soils have a surface layer of silt loam, loam, or fine sandy loam. Some areas are gravelly or cobbly.

The minor soils in this unit are well drained Udifluvents and Tioga and Chagrin soils, moderately well drained Massanetta and Monongahela soils, and poorly drained Aqualfs.

This unit is mainly used for crops and pasture. A small acreage is wooded. The Wheeling and Buckton soils are well suited to cultivated crops. Flooding and a seasonal high water table are the main limitations of these soils for farming and most other purposes.

This unit has good potential for cultivated farm crops. The potential for urban uses is poor. The potential for recreational uses is good.

12. Monongahela-Allegheny-Unison

Deep, moderately well drained to well drained soils that have a dense, compact subsoil or a subsoil of loam to clay; on stream terraces

Areas of these nearly level to moderately steep soils are mainly to the east of and adjacent to the South River. A few small areas are in the western part of the main valley. The soils are on level to hilly terraces along rivers and larger streams.

This unit makes up about 7 percent of the county. The unit is about 20 percent Monongahela soils, 18 percent Allegheny soils, 16 percent Unison soils, and 46 percent soils of minor extent.

The Monongahela soils are at about the same elevation as the Allegheny soils. The Unison soils are at a slightly higher elevation. The Monongahela soils are moderately well drained. They have a fragipan that inhibits downward movement of water. The Allegheny and Unison soils are well drained. The soils of this unit have a surface layer of fine sandy loam. Some areas are gravelly or cobbly.

The minor soils in this unit are well drained Sherando and Millrock soils, moderately well drained Philo and Cotaco soils, moderately well drained to somewhat poorly drained Buchanan soils, and poorly drained Purdy and Atkins soils.

This unit is used mainly for crops and pasture. A moderate acreage is wooded. A seasonal high water table in the Monongahela soils and the steep slopes of the Unison

soils are the main limitations for farming and other purposes.

This unit has good potential for cultivated crops and for pasture and hay. The unit mainly has good potential for urban and recreational development, but the Monongahela soils have fair potential for those uses because of seasonal wetness.

13. Craigsville-Allegheny

Deep, well drained soils that have a subsoil of gravelly sandy loam or clay loam; on stream terraces

Areas of these nearly level to sloping soils are mainly along the Calf Pasture River and its tributaries in the Deerfield and Marble Valleys. The soils are on level to rolling terraces.

This unit makes up about 3 percent of the county. The unit is about 65 percent Craigsville soils, 20 percent Allegheny soils, and 15 percent soils of minor extent.

The Craigsville soils are on low terraces adjacent to flood plains and are rarely flooded. The Allegheny soils are on terraces and are at a higher elevation than the Craigsville soils. The soils of this unit have a surface layer of fine sandy loam or cobbly fine sandy loam.

The minor soils in this unit are well drained Udorthents and Chavies soils, moderately well drained Monongahela and Ernest soils, moderately well drained to somewhat poorly drained Buchanan soils, and poorly drained Purdy soils.

This unit is used mainly for crops and pasture. A small acreage is wooded. Flooding and coarse fragments on the surface are the main limitations for farming and other uses.

This unit has good potential for cultivated crops and for pasture and hay. It has fair potential for urban and recreational purposes except where flooding occurs.

14. Sherando-Monongahela

Deep, somewhat excessively drained to moderately well drained soils that have a dense, compact subsoil or a subsoil of very gravelly sandy loam; on mountain foot slopes and terraces

Most of these nearly level to steep soils are in the Big Levels area in the southeastern part of the county. The soils are on level to rolling terraces and gently undulating to steep mountain foot slopes.

This unit makes up about 3 percent of the county. The unit is about 52 percent Sherando soils, 25 percent Monongahela soils, and 23 percent soils of minor extent.

The Sherando soils are on mountain foot slopes that are generally steep and at a higher elevation than the Monongahela soils, which are on terraces. The Sherando soils are well drained to somewhat excessively drained. The Monongahela soils are moderately well drained. They have a fragipan that inhibits the downward movement of water. The soils of this unit have a surface layer of sandy loam or fine sandy loam that contains cobblestones in some areas.

The minor soils in this unit are well drained Craigsville and Millrock soils, moderately well drained Philo soils, and poorly drained Atkins soils.

This unit is mostly wooded. A small acreage is used for crops and pasture. Steep slopes and wetness are the main limitations for farming. Wetness, rapid permeability, coarse fragments, and steep slopes are the main limitations for urbanization and other uses.

The Sherando soils have poor potential for cultivated crops, hay, or pasture. The Monongahela soils have good potential for cultivated crops, hay, and pasture. Both soils have fair potential for urbanization and other uses.

Soil maps for detailed planning

The map units shown on the detailed soil maps at the back of this publication represent the kinds of soil in the survey area. They are described in this section. The descriptions together with the soil maps can be useful in determining the potential of a soil and in managing it for food and fiber production; in planning land use and developing soil resources; and in enhancing, protecting, and preserving the environment. More information for each map unit, or soil, is given in the section "Use and management of the soils."

Preceding the name of each map unit is the symbol that identifies the soil on the detailed soil maps. Each soil description includes general facts about the soil and a brief description of the soil profile. In each description, the principal hazards and limitations are indicated, and the management concerns and practices needed are discussed.

The map units on the detailed soil maps represent an area on the landscape made up mostly of the soil or soils for which the unit is named. Most of the delineations shown on the detailed soil map are phases of soil series.

Soils that have a profile that is almost alike make up a *soil series*. Except for allowable differences in texture of the surface layer or of the underlying substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement in the profile. A soil series commonly is named for a town or geographic feature near the place where a soil of that series was first observed and mapped. The Craigsville series, for example, was named for the town of Craigsville in Augusta County.

Soils of one series can differ in texture of the surface layer or in the underlying substratum and in slope, erosion, stoniness, salinity, wetness, or other characteristics that affect their use. On the basis of such differences, a soil series is divided into phases. The name of a *soil phase* commonly indicates a feature that affects use or management. For example, Craigsville fine sandy loam is one of two phases within the Craigsville series.

Some map units are made up of two or more dominant kinds of soil. Such map units are called soil complexes or undifferentiated groups.

A *soil complex* consists of areas of two or more soils that are so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area includes some of each of the two or more dominant soils, and the pattern and proportion are somewhat similar in all areas. Frederick-Nixa complex, 2 to 7 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because there is little value in separating them. The pattern and proportion of the soils are not uniform. An area shown on the map has at least one of the dominant (named) soils or may have all of them. Elliber and Jefferson very cherty soils, 45 to 70 percent slopes, is an undifferentiated group in this survey area.

Most map units include small, scattered areas of soils other than those that appear in the name of the map unit. Some of these soils have properties that differ substantially from those of the dominant soil or soils and thus could significantly affect use and management of the map unit. These soils are described in the description of each map unit. Some of the more unusual or strongly contrasting soils that are included are identified by a special symbol on the soil map.

Most mapped areas include places that have little or no soil material and support little or no vegetation. Such places are called *miscellaneous areas*; they are delineated on the soil map and given descriptive names. Rubble land is an example. Some of these areas are too small to be delineated and are identified by a special symbol on the soil map.

The acreage and proportionate extent of each map unit are given in table 4, and additional information on properties, limitations, capabilities, and potentials for many soil uses is given for each kind of soil in other tables in this survey. (See "Summary of tables.") Many of the terms used in describing soils are defined in the Glossary.

1B—Allegheny fine sandy loam, 1 to 7 percent slopes. This gently sloping, well drained soil is on terraces and benches along the larger streams. Areas of these soils are commonly elongated or rectangular and follow the course of the adjacent stream. They range from 5 to 100 acres.

Typically, the surface layer is dark brown fine sandy loam about 6 inches thick. The subsoil is dark brown loam or sandy clay loam to a depth of 34 inches. The substratum extends to a depth of 60 inches or more. It is yellowish brown sandy loam that has sandstone pebbles and cobblestones.

Included with this soil in mapping are small, intermingled areas of Craigsville, Chavies, Monongahela, and Shenval soils. Craigsville and Chavies soils are commonly on the lower lying areas near the flood plains. Monongahela soils are in depressions and at the heads of drainageways. Shenval soils are on the higher areas near the uplands. Also included are spots of gravelly and cobbly soils along shallow drainageways. Included soils make up about 15 percent of the mapped acreage of this unit.

Permeability of this soil is moderate, and available water capacity is medium. Surface runoff is slow. Tilth is good, but the soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is slight.

This soil has good potential for farming, and most of the acreage is farmed. It has good potential for many urban uses and for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay. The main management concern is the need to maintain adequate organic matter content. The use of lime and ferilizer helps to offset acidity and increase fertility. If the soil is cultivated, minimum tillage, use of cover crops, including grasses and legumes in the cropping system, and keeping crop residue on or near the surface help to increase fertility and organic matter content.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are the major concerns of pasture management. Use of proper stocking rates to maintain desirable grasses and legumes, rotation of pastures, deferment of grazing, and the use of lime and fertilizer to offset acidity and increase fertility are suitable practices of pasture management. If pastures on this soil are overgrazed, surface runoff and the hazard of erosion increase.

This soil is well suited to trees, but only a small acreage is wooded. The soil is managed mostly for white pine.

This soil is suited to most urban uses. Groundwater pollution is a hazard when the soil is used for septic tank absorption fields. Capability subclass IIe.

2B—Allegheny cobbly soils, 1 to 7 percent slopes. These gently sloping, well drained soils are on river and stream terraces which are generally adjacent to mountain foot slopes or along streams. Areas of these soils are commonly elongated and follow the course of the adjacent stream. They range from 10 to 100 acres.

Typically, the surface layer is dark brown cobbly fine sandy loam about 6 inches thick. The subsoil is dark brown loam or sandy clay loam to a depth of 34 inches. The substratum extends to a depth of 60 inches or more. It is yellowish brown sandy loam that has sandstone pebbles and cobblestones.

Included with these soils in mapping are small, intermingled areas of Craigsville, Monongahela, and Laidig soils. The Craigsville soils are coarser textured than these Allegheny soils but occupy the same parts of the landscape. The Laidig soils are commonly on the steeper part of the landscape adjacent to the uplands. Monongahela soils are wetter than these Allegheny soils and are nearly level. Also included are small areas of stony soils. Included soils

make up about 15 percent of the mapped acreage of this unit.

Permeability of these soils is moderate, and available water capacity is medium. Surface runoff is slow. Tilth is fair, but natural fertility and organic matter content are low. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is slight.

These soils have fair potential for farming, and most of the acreage is farmed. They have good potential for many urban uses and for grasses and trees.

These soils are suited to cultivated crops and to pasture and hay. Cobblestones interfere somewhat with tillage operations and seeding. A main management concern is the need to increase and maintain organic matter content. The use of lime and fertilizer helps to offset acidity and increase fertility. If these soils are cultivated, minimum tillage, use of cover crops, including grasses and legumes in the cropping system, and keeping crop residue on or near the surface help to increase fertility and organic matter content.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major concerns of pasture management. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer to offset acidity and increase fertility are suitable practices of pasture management. If pastures on these soils are overgrazed, runoff and the the hazard of erosion increase.

These soils are well suited to trees, but only a small acreage is wooded. They are managed mostly for white pine.

These soils are well suited to most urban uses. Capability subclass IIIe.

3B—Allegheny-Cotaco fine sandy loams, 1 to 7 percent slopes. These nearly level to gently sloping, well drained and moderately well drained soils are so intermingled that it was not practical to map them separately. The soils are on smooth, broad terraces adjacent to the flood plains of the larger streams and rivers and are on long colluvial fans adjacent to the mountain foot slopes. Slopes are smooth and are about 100 to 2,000 feet long. Areas of this unit are irregularly shaped or are long and winding. They range from 5 to 500 acres or more. This unit is about 45 percent Allegheny soils, 40 percent Cotaco soils, and 15 percent included soils.

Typically, the Allegheny soils have a surface layer of dark brown fine sandy loam about 6 inches thick. The subsoil is dark brown loam or sandy clay loam to a depth of 34 inches. The substratum extends to a depth of 60 inches or more. It is yellowish brown sandy loam that has sandstone pebbles and cobblestones.

Typically, the Cotaco soils have a surface layer of yellowish brown fine sandy loam about 9 inches thick. The subsoil is 35 inches thick. The upper 20 inches is yellowish brown loam, sandy clay loam, or light clay loam with light brownish gray mottles in the lower part. The lower 15 inches is strong brown light clay loam and has red and grayish brown mottles. The substratum is strong brown sandy clay loam to a depth of 60 inches or more.

Included with these soils in mapping are small, intermingled areas of Unison, Monongahela, and Purdy soils. They make up about 10 percent of this unit. Unison soils are commonly on the higher areas near the uplands. Monongahela and Purdy soils are in depressions and at the heads of drainageways. Also included are some sinkholes, small wet spots, and small areas of gravelly and cobbly soils. These areas make up about 5 percent of the unit.

Permeability is moderate in these soils, and available water capacity is medium. Surface runoff is slow to medium. Tilth is good, but the soils are low in natural fertility and organic matter content. The subsoil of both soils has a low shrink-swell potential. The root zone mainly extends to a depth of about 60 inches but is generally shallower in the Cotaco soils. The surface layer and subsoil of these soils are commonly strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is slight to moderate.

These soils have good potential for farming, and most of the acreage is farmed. They have fair potential for many urban uses. They have good potential for grasses and trees.

These soils are suited to cultivated crops and to pasture and hay. Alfalfa is short lived on the Cotaco soils because of seasonal wetness and restricted root growth. The Cotaco soils tend to be droughty during the growing season. Controlling erosion and increasing fertility and organic matter content are the main management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soils are cultivated, minimum tillage, use of cover crops, including grasses and legumes in the cropping system, and keeping crop residue on or near the surface help to increase fertility and organic matter content.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If the pasture is overgrazed, runoff and the hazard of erosion increase.

These soils are suited to trees, but only a small acreage is wooded. The soils are managed for pines and hardwoods.

The Cotaco soils have a seasonal high water table in winter and spring that limits this unit for many urban purposes. Capability subclass IIw.

3C—Allegheny-Cotaco fine sandy loams, 7 to 15 percent slopes. These sloping, well drained and moderately well drained soils are so intermingled that it was not

practical to map them separately. The soils are on broad terraces adjacent to the flood plains of the larger streams and rivers and are on long colluvial fans adjacent to the mountain foot slopes. Slopes are smooth and are about 50 to 800 feet long. Areas of this complex are irregularly shaped or are long and winding. They range from 3 to 300 acres or more. This unit is about 50 percent Allegheny soils, 35 percent Cotaco soils, and 15 percent included soils.

Typically, the Allegheny soils have a surface layer of dark brown fine sandy loam about 6 inches thick. The subsoil is dark brown loam or sandy loam or sandy clay loam to a depth of 34 inches. The substratum extends to a depth of 60 inches or more. It is yellowish brown sandy loam that has sand stone pebbles and cobblestones.

The Cotaco soils have a surface layer of fine sandy loam about 9 inches thick. The subsoil is 35 inches thick. The upper 20 inches is yellowish brown loam, sandy clay loam, or light clay loam and has light brownish gray mottles in the lower part. The lower 15 inches is strong brown light clay loam with red and grayish brown mottles. The substratum is strong brown sandy clay loam to a depth of 60 inches or more.

Included with these soils in mapping are small, intermingled areas of Unison and Monongahela soils. They make up about 10 percent of this unit. Unison soils are commonly on the higher areas near the uplands. Monongahela soils are in depressions and at the heads of drainageways. Also included are a few sinkholes, small wet spots, and small areas of gravelly and cobbly soils. These areas make up about 5 percent of the unit.

Permeability of these soils is moderate, and available water capacity is medium. Runoff is medium to rapid. Tilth is good, but the soils are low in natural fertility and organic matter content. The subsoil of both soils has a low shrink-swell potential. The root zone mainly extends to a depth of about 60 inches but is generally shallower in the Cotaco soils. The surface layer and subsoil of these soils are commonly strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is severe.

These soils have good potential for farming, and much of the acreage is farmed. They have fair potential for many urban uses. They have good potential for grasses and trees.

These soils are suited to cultivated crops and to pasture and hay. Alfalfa is short lived on the Cotaco soils because of seasonal wetness and restricted root growth. The Cotaco soils are droughty during the growing season. Controlling erosion and increasing organic matter content are major management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soils are cultivated, minimum tillage, use of cover crops, including grasses and legumes in the cropping system, and keeping crop residue on or near the surface help to maintain fertility and organic matter content.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer to offset the acidity and increase fertility are suitable practices of pasture management. If pastures on these soils are overgrazed, runoff and the hazard of erosion increase.

These soils are suited to trees, and a moderate acreage is wooded. The soils are managed for pines and hardwoods.

These soils are limited for many urban uses by slope and a seasonal high water table in the Cotaco soils. Capability subclass IIIe.

4B—Allegheny-Cotaco cobbly fine sandy loams, 1 to 7 percent slopes. These nearly level to gently sloping, well drained and moderately well drained soils are so intermingled that it was not practical to map them separately. The soils are on smooth, broad terraces adjacent to the flood plains of the larger streams and rivers and are on long colluvial fans adjacent to the mountain foot slopes. Slopes are smooth and are about 100 to 1,000 feet long. Areas of this unit range from 3 to 100 acres or more. This unit is about 40 percent Allegheny soils, 40 percent Cotaco soils, and 20 percent included soils.

Typically, the Allegheny soils have a surface layer of dark brown cobbly fine sandy loam about 6 inches thick. The subsoil is dark brown loam or sandy clay loam to a depth of 34 inches. The substratum extends to a depth of 60 inches or more. It is yellowish brown sandy loam that has sandstone pebbles and cobblestones.

Typically, the Cotaco soils have a surface layer of yellowish brown fine sandy loam about 9 inches thick. The subsoil is 35 inches thick. The upper 20 inches is yellowish brown loam, sandy clay loam, or light clay loam and has light brownish gray mottles in the lower part. The upper 15 inches is strong brown light clay loam with red and grayish brown mottles. The substratum is strong brown sandy clay loam to a depth of 60 inches or more.

Included with these soils in mapping are small intermingled areas of Unison, Monongahela, and Purdy soils. They make up about 15 percent of this unit. Unison soils are commonly on the higher areas near the uplands. Monongahela and Purdy soils are in depressions and at the heads of drainageways. Also included are scattered sinkholes and small wet spots that make up about 5 percent of the unit.

Permeability of the soils is moderate, and available water capacity is medium. Runoff is slow to medium. Tilth is good. The soils are low in natural fertility and organic matter content. The subsoil of both soils has a low shrink-swell potential. The root zone mainly extends to a depth of about 60 inches but is generally shallower in the Cotaco soil. The surface layer and subsoil of these soils are commonly strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is slight to moderate.

These soils have fair potential for farming, and a moderate acreage is farmed. They have fair potential for many urban uses. They have fair potential for grasses and good potential for trees.

These soils are moderately well suited to cultivated crops and to pasture and hay. Alfalfa is short lived on the Cotaco soils because of seasonal wetness and restricted root growth. The Cotaco soils are droughty during the growing season. Cobblestones and pebbles damage tillage equipment and interfere with planting. Controlling erosion and increasing organic matter content are major management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soils are cultivated, minimum tillage, use of cover crops, keeping crop residue at or near the surface, and including grasses and legumes in the cropping system help to increase fertility and organic matter content.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures on these soils are overgrazed, runoff and the hazard of erosion increase.

These soils are suited to trees, and a moderate acreage is wooded. The soils are managed for pines and hardwoods.

These soils are limited for many urban purposes by a seasonal high water table in the Cotaco soils. Capability subclass IIw.

4C—Allegheny-Cotaco cobbly fine sandy loams, 7 to 15 percent slopes. These sloping, well drained to moderately well drained soils are so intermingled that it was not practical to map them separately. The soils are on broad terraces adjacent to the flood plains of the larger streams and rivers and are on long colluvial fans adjacent to the mountain foot slopes. Slopes are smooth and are about 50 to 500 feet long. Areas of this unit are irregularly shaped or are long and winding. They range from 3 to 50 acres or more. This unit is about 50 percent Allegheny soils, 35 percent Cotaco soils, and 15 percent included soils.

Typically, the Allegheny soils have a surface layer of dark brown cobbly fine sandy loam about 6 inches thick. The subsoil is dark brown loam or sandy clay loam to a depth of 34 inches. The substratum extends to a depth of 60 inches or more. It is yellowish brown sandy loam that has sandstone pebbles and cobblestones.

Typically, the Cotaco soils have a surface layer of yellowish brown fine sandy loam about 9 inches thick. The subsoil is 35 inches thick. The upper 20 inches is yellowish brown loam, sandy clay loam, or light clay loam and has light brownish gray mottles in the lower part. The lower 15 inches is strong brown light clay loam with red and brown mottles. The substratum is strong brown sandy clay loam to a depth of 60 inches or more.

Included with these soils in mapping are small, intermingled areas of Unison and Monongahela soils. They make up about 10 percent of this unit. Unison soils are commonly on the higher areas near the uplands. Monongahela soils are in depressions and at the heads of drainageways. Also included are a few scattered sinkholes and small wet spots that make up about 5 percent of the unit.

Permeability of these soils is moderate, and available water capacity is medium. Surface runoff is medium to rapid. Tilth is good. The soils are low in natural fertility and organic matter content. The subsoil of both soils has a low shrink-swell potential. The root zone mainly extends to a depth of about 60 inches but is generally shallower in the Cotaco soils. The surface layer and subsoil of these soils are commonly strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is severe.

These soils have fair potential for farming, and a moderate acreage is farmed. They have fair potential for many urban uses. They have fair potential for grasses and good potential for trees.

These soils are moderately well suited to cultivated crops and to pasture and hay. Alfalfa is short lived on the Cotaco soils because of seasonal wetness and restricted root growth. The Cotaco soils are droughty during the growing season. Cobblestones and pebbles damage tillage equipment and interfere with planting. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. If these soils are cultivated, minimum tillage, use of cover crops, including grasses and legumes in the cropping system, and keeping crop residue at or near the surface help fertility and organic matter content.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed on these soils, runoff and the hazard of erosion increase.

These soils are suited to trees, and a fairly large acreage is wooded. The soils are managed for pines and hardwoods.

These soils are limited for many urban purposes by a seasonal high water table in the Cotaco soils. Capability subclass IVe.

5—Aqualfs, nearly level. This unit consists of nearly level to depressional, loamy or clayey soils that are around the heads of or along small, narrow drainageways and in small depressions on terraces. The soils formed in material washed from soils underlain by limestone and calcareous shale. Areas are generally elongated or round. They range from 1 to 15 acres but are commonly less than 3 acres. They are scattered throughout the valleys of the county. Slopes are 0 to 3 percent.

The soils in this unit vary in drainage but are dominantly poorly drained or very poorly drained. Some areas are ponded during the wetter months. Some are underlain by stratified layers of gravel and cobblestones at a depth of more than 30 inches.

Included with this unit in mapping are small areas of Chilhowie, Edom, and Endcav soils. These areas make up about 10 percent of the mapped acreage of the unit.

Permeability is slow in the soils of this unit. Available water capacity is medium to high. Runoff is very slow on these soils, and they receive seepage and overflow from surrounding higher lying areas. The hazard of erosion is slight.

The areas of this unit are mostly idle. Some of the areas are drained and used for pasture. A few small areas are in woodland or are farmed.

These soils have poor potential for most uses because of wetness. They have fair to good potential for nature areas and for some kinds of wildlife habitat. Capability subclass not assigned.

6—Aquents, loamy-skeletal. This unit consists of nearly level to very gently sloping loamy soils formed in material containing various amounts of shale fragments. The unit is on toe slopes, alluvial fans, and along small, narrow drainageways. The soils formed in material washed from the surrounding shale uplands. Areas are generally elongated or triangular. They range from 1 to 20 acres and are throughout areas of the county underlain by shale. Slopes are 0 to 4 percent.

The soils vary in drainage but are dominantly somewhat poorly drained to poorly drained. Shale fragments make up 2 to 75 percent of the surface layer and 25 to 80 percent of the substratum.

Included with this unit in mapping are small areas of Berks and Weikert soils. Also included are spots of very poorly drained soils and small areas that consist mostly of shale fragments with little or no soil material. Included areas make up about 20 percent of this unit.

Permeability is moderately rapid to slow in the soils of this unit. Available water capacity is low. Runoff is very slow, and these soils receive seepage and overflow from surrounding higher areas. A seasonal water table is within 1 1/2 feet of the surface. The hazard of erosion is slight.

The areas of this unit are mostly in pasture or are idle. A few small areas are in water-tolerant hardwoods.

These soils have poor potential for most uses because of wetness. They have fair potential for wildlife habitat or nature areas. Capability subclass not assigned.

7—Atkins fine sandy loam. This deep, nearly level to very gently sloping, poorly drained soil is on flood plains along the major streams and rivers. Slopes range from 0 to 4 percent, are smooth or slightly concave, and are about 100 to 400 feet long. Areas of this soil are irregularly shaped or long and narrow. They range from 3 to 50 acres.

Typically, the surface layer is very dark grayish brown and dark gray fine sandy loam about 9 inches thick. The subsoil is 31 inches thick. The upper 12 inches is dark gray or black loam. The middle 12 inches is dark gray sandy loam or fine sandy loam. The lower 7 inches is very dark gray sandy clay loam. The substratum is gray and dark gray sandy clay loam to a depth of more than 60 inches.

Included with this soil in mapping are small intermingled areas of moderately well drained Philo soils. They make up about 5 percent of this unit.

Permeability is moderately slow in this soil, and available water capacity is high. Surface runoff is slow. Tilth is good, but the soil is low in natural fertility. The subsoil has a low shrink-swell potential. The root zone generally extends to a depth of about 60 inches, depending on the depth to the water table. The surface layer and the subsoil are commonly strongly acid or very strongly acid unless lime has been applied. The hazard of erosion is slight.

This soil has fair potential for farming. Much of the acreage is in pasture or woodland. The soil has poor potential for most urban uses. It has fair potential for grasses and good potential for trees.

This soil is moderately well suited to cultivated crops and to pasture and hay. Alfalfa is short lived because of seasonal wetness. The main management concerns are the need for drainage and the control of flooding. The use of lime and fertilizer helps to offset the acidity and increase fertility. If the soil is cultivated, keeping crop residue on or near the surface, using cover crops, and including grasses and legumes in the cropping system help to increase organic matter content and maintain tilth.

Establishing and maintaining a mixture of grasses and legumes, proper grazing, and drainage are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures on this soil are overgrazed, some of the desirable grasses and legumes die out. Grazing during periods of wetness cuts up and compacts the surface layer.

This soil is suited to trees, and a moderate acreage is wooded. The soil is managed for pines and hardwoods. The use of timber harvest equipment is limited by long periods of wetness.

This soil is limited for many urban purposes by a seasonal high water table during winter and spring and by flooding. Capability subclass IIIw.

8D—Berks channery silt loam, 7 to 25 percent slopes. This moderately deep, sloping to moderately steep, well drained soil is on narrow, convex upper side slopes and ridgetops. Slopes are smooth, commonly complex, and about 50 to 200 feet long. Areas of this soil are commonly long and winding. They range from 3 to 100 acres or more.

Typically, the surface layer is dark brown or yellowish brown channery silt loam about 10 inches thick. The subsoil is yellowish brown and strong brown shaly silt loam

and very shaly loam about 17 inches thick. The substratum is yellowish brown very shaly silt loam 3 inches thick. Fractured shale is at a depth of 30 inches.

Included with this soil in mapping are small, intermingled areas of Weikert, Chilhowie, Sequoia, and Monongahela soils. They make up about 15 to 20 percent of this unit. Also included are small wet spots, shale outcrops, small areas of soils with cobbles, and small areas of soils with a reddish brown subsoil. These make up from 5 to 10 percent of this unit.

Permeability is moderate to rapid in this soil, and available water capacity is very low. Runoff is medium to rapid. Tilth is fair, but the soil is low in natural fertility and organic matter content. The surface has numerous hard shale fragments. The subsoil has low shrink-swell potential. The root zone extends to a depth of 27 inches. The surface layer and the subsoil are commonly strongly acid to very strongly acid unless lime has been applied. Rippable bedrock is at a depth of 1 1/2 to 3 feet. The hazard of erosion is severe.

This soil has poor potential for farming, and most of the acreage is in woodland. It has poor potential for most urban uses and fair potential for grasses and trees.

This soil is not suited to cultivated crops and is moderately well suited to pasture and hay. It is droughty during the growing season. Controlling erosion, increasing fertility and organic matter content, establishing and maintaining a mixture of grasses and legumes, and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures on this soil are overgrazed, runoff and the hazard of erosion increase.

This soil is moderately well suited to trees, and a large acreage is wooded. The soil is managed for hardwoods and pines. The use of timber equipment is limited by slope.

This soil is limited for many urban purposes by slope and depth to bedrock. Capability subclass VIe.

8E—Berks channery silt loam, 25 to 45 percent slopes. This moderately deep, steep, well drained soil is on convex side slopes of ridges. Slopes are commonly complex and are about 50 to 500 feet long. Areas of this soil are irregularly shaped and long and winding. They range from 3 to 100 acres or more.

Typically, the surface layer is dark brown and yellowish brown channery silt loam about 10 inches thick. The subsoil is yellowish brown and strong brown shaly silt loam and very shaly loam 17 inches thick. The substratum is yellowish brown very shaly silt loam 3 inches thick. Fractured shale is at a depth of 30 inches.

Included with this soil in mapping are small, intermingled areas of Weikert, Chilhowie, and Monongahela soils. They make up about 15 to 20 percent of this unit. Also included are small wet spots, shale outcrops, small areas of soils with a cobbly surface layer, and small areas of soils with a reddish brown subsoil. These make up 5 to 10 percent of this unit.

Permeability is moderate to rapid in this soil, and available water capacity is very low. Runoff is very rapid. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 27 inches. The surface layer and the subsoil are commonly strongly acid to very strongly acid. Rippable bedrock is at a depth of 1 1/2 to 3 feet. The hazard of erosion is severe.

This soil has poor potential for farming, and most of the acreage is in woodland. It has fair potential for most urban uses and for grasses and trees.

This soil is not suited to cultivated crops and is moderately well suited to pasture. It is droughty during the growing season. Controlling erosion, increasing organic matter content and fertility, establishing and maintaining a mixture of grasses and legumes, and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures and deferment of grazing are suitable practices of pasture management. If pastures are overgrazed on this soil, runoff and the hazard of erosion increase.

This soil is moderately well suited to trees, and a large acreage is wooded. The soil is managed for hardwoods and pines. The use of timber equipment is limited by slope.

This soil is limited for many urban purposes by slope and depth to bedrock. Capability subclass VIIs.

8F—Berks channery silt loam, 45 to 60 percent slopes. This moderately deep, very steep, well drained soil is on concave side slopes of ridges. Slopes are commonly complex and are about 100 to 500 feet long. Areas of this soil are commonly long and winding. They range from 3 to 200 acres or more.

Typically, the surface layer is dark brown and yellowish brown channery silt loam about 10 inches thick. The subsoil is yellowish brown and strong brown shaly silt loam and very shaly loam about 17 inches thick. The substratum is yellowish brown very shaly silt loam 3 inches thick. Fractured shale is at a depth of 30 inches.

Included with this soil in mapping are small, intermingled areas of Weikert soils that have a surface layer of yellowish brown very shaly silt loam. They make up about 20 percent of this unit. Also included are shale outcrops and small areas of soils with a reddish brown subsoil. These make up about 5 percent of the unit.

Permeability is moderate to rapid in this soil, and available water capacity is very low. Runoff is very rapid. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 27 inches. The surface layer and the subsoil are commonly strongly acid to very strongly acid. Rippable bedrock is at a depth of 1 1/2 to 3 feet. The hazard of erosion is severe.

This soil has poor potential for farming, and most of the acreage is in woodland. It has poor potential for most urban uses and fair potential for grasses and trees.

This soil is not suited to cultivated crops and is poorly suited to pasture. It is droughty during the growing season. Controlling erosion, increasing organic matter content and fertility, establishing and maintaining a mixture of grasses and legumes, and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, and deferment of grazing are suitable practices of pasture management. If pastures are overgrazed on this soil, runoff and the hazard of erosion increase.

This soil is moderately well suited to trees, and a large acreage is wooded. The soil is managed for hardwoods and pines. The use of timber equipment is limited by slope.

This soil is limited for many urban purposes by slope and depth to bedrock. Capability subclass VIIs.

9B2—Berks-Weikert shaly silt loams, 2 to 7 percent slopes, eroded. These gently sloping, well drained soils are so intermingled that it was not practical to map them separately. The soils are on slightly convex knolls, along narrow ridgetops, and on side slopes. Slopes are complex and are about 50 to 300 feet long. Many of the larger areas of this unit have shallow drainageways 50 to 200 feet apart. Areas commonly are long and winding. They range from 5 to 50 acres or more. This unit is about 55 percent Berks soils, 25 percent Weikert soils, and 20 percent included soils.

Typically, the Berks soils have a surface layer of dark brown and yellowish brown shaly silt loam about 10 inches thick. The subsoil is yellowish brown and strong brown shaly silt loam and very shaly loam about 17 inches thick. The substratum is yellowish brown very shaly silt loam 3 inches thick. Fractured shale is at a depth of 30 inches.

Typically, the Weikert soils have a surface layer of yellowish brown very shaly silt loam about 5 inches thick. The subsoil is yellowish brown very shaly silt loam about 9 inches thick. The substratum is yellowish brown very shaly silt loam 5 inches thick. Acid shale is at a depth of 19 inches.

Included with these soils in mapping are small, intermingled areas of Sequoia soils that make up about 10 percent of this unit. Also included are small wet areas along drainageways, small areas of rock outcrop, small areas of nonshaly soils, and small areas of neutral soils underlain by thin strata of limestone. These make up about 10 percent of the unit.

Permeability of the Berks soils is moderate and of the Weikert soils is moderately rapid. Available water capacity of both soils is very low. Runoff is medium to rapid. Tilth is fair, but natural fertility and organic matter content are low. The subsoil of both soils has a low shrink-swell potential. The root zone extends to a depth of about 20 inches in the Berks soils and 14 inches in the Weikert soils. The surface layer and subsoil of these soils are commonly strongly acid or very strongly acid unless lime has been applied. The hazard of erosion is severe. Bedrock is at a depth of 1 1/2 to 3 feet in the Berks soils and 1 to 1 1/2 feet in the Weikert soils.

These soils have poor potential for farming, and much of the acreage is in pasture or woodland. They have poor potential for many urban uses and fair potential for grasses and trees.

These soils are poorly suited to cultivated crops and moderately well suited to pasture and hay. They are droughty during the growing season. Controlling erosion, increasing organic matter content and fertility, establishing and maintaining a mixture of grasses and legumes, and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures on these soils are overgrazed, runoff and the hazard of erosion increase.

These soils are suited to trees, and a moderate acreage is wooded. The soils are managed mostly for pines.

This complex is limited for many urban purposes by depth to bedrock. Capability subclass IVe.

9C2—Berks-Weikert shaly silt loams, 7 to 15 percent slopes, eroded. These sloping, well drained soils are so intermingled that it was not practical to map them separately. The soils are on convex knolls along narrow ridgetops and on side slopes. Slopes are rough and complex and are about 50 to 300 feet long. Many of the larger areas of this complex have shallow drainageways 50 to 200 feet apart. Areas commonly are long and winding. They range from 5 to 50 acres or more. This unit is about 55 percent Berks soils, 25 percent Weikert soils, and 20 percent included soils.

Typically, the Berks soils have a surface layer of dark brown and yellowish brown shaly silt loam about 10 inches thick. The subsoil is yellowish brown and strong brown shaly silt loam and very shaly loam 17 inches thick. The substratum is yellowish brown very shaly silt loam 3 inches thick. Fractured shale is at a depth of 30 inches.

Typically, the Weikert soils have a surface layer of yellowish brown very shaly silt loam about 5 inches thick. The subsoil is yellowish brown very shaly silt loam about 9 inches thick. The substratum is yellowish brown very shaly silt loam 5 inches thick. Acid shale is at a depth of 19 inches.

Included with these soils in mapping are small, intermingled areas of Sequoia soils that have finer textured subsoil than these Berks and Weikert soils and that make up about 10 percent of this unit. Also included are small wet areas along drainageways, small areas of rock outcrop, small areas of nonshaly soils, and small areas of neutral soils underlain by thin strata of limestone. These make up about 10 percent of the unit.

Permeability of the Berks soils is moderate and of the Weikert soils is moderately rapid. Available water capacity is very low. Runoff is medium to rapid. Tilth is fair, but natural fertility and organic matter content are low. The subsoil of each soil has a low shrink-swell potential. The root zone extends to a depth of about 20 inches in the Berks soils and 14 inches in the Weikert soils. The surface layer and subsoil of these soils are commonly strongly acid or very strongly acid unless lime has been applied. Bedrock is at a depth of 1 1/2 to 3 feet in the Berks soils and 1 to 1 1/2 feet in the Weikert soils. The hazard of erosion is severe.

These soils have poor potential for farming, and much of the acreage is in pasture or woodland. They have poor potential for many urban uses and fair potential for grasses and trees.

These soils are not suited to cultivated crops but are moderately well suited to pasture and hay. They are droughty during the growing season. Controlling erosion, increasing organic matter content and fertility, establishing and maintaining a mixture of grasses and legumes, and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

These soils are suited to trees, and a moderate acreage is wooded. The soils are managed mostly for pines.

These soils are limited for many urban purposes by depth to bedrock. Capability subclass VIe.

10B2—Bookwood silt loam, 2 to 7 percent slopes, eroded. This moderately deep, gently sloping, well drained soil is on narrow to somewhat broad, convex ridgetops. Slopes are smooth, commonly complex, and about 100 to 600 feet long. Areas of this soil are generally long and winding. They range from 2 to 80 acres.

Typically, the surface layer is yellowish brown silt loam about 6 inches thick. The subsoil is strong brown gravelly loam or gravelly clay loam about 24 inches thick. The substratum is 6 inches thick. It is yellowish red weathered limestone and strong brown siltstone mixed with yellowish red silty clay loam. Strongly weathered limestone is at a depth of 36 inches.

Included with this soil in mapping are small, intermingled areas of Frederick, Christian, and Endcav soils that make up 10 to 20 percent of this unit. Also included are small areas of rock outcrop, small severely eroded spots, and small areas of cherty soils. These make up 5 to 10 percent of the unit.

Permeability is moderate in this soil, and available water capacity is low. Runoff is medium. Tilth is good under optimum moisture conditions. The soil is medium in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 30 inches. The surface layer and subsoil are commonly medium acid unless lime has been applied. Hard, unweathered bedrock is mainly at a depth of 3 1/2 to 5 feet. The hazard of erosion is moderate.

The soil has good potential for farming, and much of the acreage is farmed. It has fair potential for many urban uses and good potential for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay. Controlling erosion and increasing organic matter content are major management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Keeping crop residue on or near the surface is suitable for this soil.

Establishing and maintaining a mixture of grasses and legumes and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is suited to trees, and a moderate acreage is wooded. The soil is managed mostly for pines and hardwoods.

This soil is limited for many urban purposes by depth to bedrock. Capability subclass IIe.

10C2—Bookwood silt loam, 7 to 15 percent slopes, eroded. This moderately deep, sloping, well drained soil is on side slopes of hills and ridges. Slopes are smooth, commonly complex, and about 100 to 800 feet long. Areas of this soil are rectangular or long and winding. They range from 2 to 100 acres.

Typically, the surface layer is yellowish brown silt loam about 6 inches thick. The subsoil is strong brown gravelly loam or gravelly clay loam about 24 inches thick. The substratum is 6 inches thick. It is yellowish red weathered limestone and strong brown siltstone mixed with yellowish red silty clay loam. Strongly weathered limestone is at a depth of 36 inches.

Included with this soil in mapping are small, intermingled areas of Frederick, Christian, Endcav, and Timberville soils that make up 10 to 20 percent of this unit. The Timberville soils are along drainageways. Also included are small areas of rock outcrop, small severely eroded spots, and small areas of cherty soils. These make up from 5 to 10 percent of the unit.

Permeability is moderate in this soil, and available water capacity is low. Runoff is medium to rapid. Tilth is good under optimum moisture conditions. The soil is medium in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 30 inches. The surface layer and subsoil are commonly medium acid unless lime has been applied. Hard, unweathered bedrock is mainly at a depth of 3 1/2 to 5 feet. The hazard of erosion is severe.

This soil has fair potential for farming, and much of the acreage is farmed. It has fair potential for many urban uses and good potential for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is suited to trees, and a moderate acreage is wooded. The soil is managed mostly for pines and hardwoods.

This soil is limited for many urban purposes by slope and depth to bedrock. Capability subclass IIIe.

10D2—Bookwood silt loam, 15 to 25 percent slopes, eroded. This moderately deep, moderately steep, well drained soil is on the side slopes of hills and ridges. Slopes are smooth, commonly complex, and about 100 to 500 feet long. Areas of this soil are rectangular or elongated. They range from 2 to 50 acres.

Typically, the surface layer is yellowish brown silt loam about 6 inches thick. The subsoil is strong brown gravelly loam or gravelly clay loam about 24 inches thick. The substratum is 6 inches thick. It is yellowish red weathered limestone and strong brown siltstone mixed with yellowish red silty clay loam. Strongly weathered limestone is at a depth of 36 inches.

Included with this soil in mapping are small, intermingled areas of Frederick and Christian soils that make up 5 to 10 percent of this unit. Also included are small areas of rock outcrop, small severely eroded spots, and small areas of cherty soils. These make up less than 5 percent of the unit.

Permeability is moderate in this soil, and available water capacity is low. Runoff is rapid. Tilth is good under optimum moisture conditions. The soil is medium in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 30 inches. The surface layer and subsoil are commonly medium acid unless lime has been applied. Hard, unweathered bedrock is generally at a depth of 3 1/2 to 5 feet. The hazard of erosion is severe.

This soil has fair potential for farming, and much of the acreage is in pasture. It has poor potential for many urban uses and good potential for grasses and trees.

This soil is poorly suited to cultivated crops. It is better suited to pasture and hay. The main limitations are the hazard of erosion and slope. The main management concerns are increasing organic matter content, establishing and maintaining a mixture of grasses and legumes, and preventing overgrazing. The use of lime and fertilizer helps to offset acidity and increase fertility. The use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures and deferment of grazing are suitable pasture management practices. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is suited to trees, and a moderate acreage is wooded. The soil is managed mostly for pines and hardwoods. The use of timber harvesting equipment is limited by slope.

This soil is limited for many urban purposes by slope and depth to bedrock. Capability subclass IVe.

10E2—Bookwood silt loam, 25 to 45 percent slopes, eroded. This moderately deep, steep, well drained soil is on side slopes of hills and ridges. Slopes are smooth, commonly complex, and about 100 to 300 feet long. Areas of this soil are rectangular or are narrow and winding below the ridges. The areas range from 2 to 30 acres.

Typically, the surface layer is yellowish brown silt loam about 6 inches thick. The subsoil is strong brown gravelly loam or gravelly clay loam about 24 inches thick. The substratum is 6 inches thick. It is yellowish red weathered limestone and strong brown siltstone mixed with yellowish red silty clay loam. Strongly weathered limestone is at a depth of 36 inches.

Included with this soil in mapping are small, intermingled areas of Frederick and Christian soils that make up about 10 percent of this unit. Also included are small areas of rock outcrop, small severely eroded spots, and small areas of cherty soils. These make up 10 to 15 percent of the unit.

Permeability is moderate in this soil, and available water capacity is low. Surface runoff is rapid. The soil is medium in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 30 inches. The surface layer and subsoil are commonly medium acid unless lime has been applied. Hard, unweathered bedrock is generally at a depth of 3 1/2 to 5 feet. The hazard of erosion is severe.

This soil has poor potential for farming, and much of the acreage is in pasture or woodland. It has poor potential for many urban purposes. It has fair potential for grasses and good potential for trees.

This soil is not suited to cultivated crops and is moderately well suited to pasture. The hazard of erosion and steep slopes are the main limitations. Increasing organic matter, establishing and maintaining a mixture of grasses and legumes, and prevention of overgrazing are the main pasture management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. The use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures and deferment of grazing are suitable pasture management practices. If pas-

tures are overgrazed, runoff and the hazard of erosion increase.

The soil is suited to trees, and a fairly large acreage is wooded. The soil is managed mostly for pines and hardwoods. The use of timber harvesting equipment is limited by steep slopes.

This soil is limited for many urban purposes by steep slopes and depth to bedrock. Capability subclass VIe.

11A—Buchanan fine sandy loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on broad terraces of rivers and major streams. Slopes are smooth and about 100 to 800 feet long. Areas of this soil are commonly irregular in shape. They range from 2 to 100 acres or more.

Typically, the surface layer is very dark grayish brown fine sandy loam about 3 inches thick. The subsurface layer is brown and pale brown fine sandy loam and loam 8 inches thick. The subsoil is 33 inches thick. The upper 9 inches is yellowish brown sandy clay loam with light gray, strong brown, and brownish yellow mottles. The lower 24 inches is a fragipan of yellowish brown and brownish yellow clay loam and sandy clay loam with light gray and strong brown mottles. The substratum extends to a depth of more than 60 inches. It is gray, brownish yellow, and dark brown clay to a depth of 55 inches and is mottled, light gray fine sandy clay loam at a depth of more than 55 inches.

Included with this soil in mapping are small, intermingled areas of Cotaco, Monongahela, Purdy, and Allegheny soils that make up about 15 percent of this unit. Cotaco and Monongahela soils are similar to this Buchanan soil, Purdy soil is finer textured, and Allegheny soil is better drained. Also included are small areas of soils with a cobbly surface layer and small areas of neutral soils. These make up about 5 percent of this unit.

Permeability of this soil is moderate above and below the fragipan and slow in the fragipan. Available water capacity is medium. Runoff is slow. Tilth is good, but the soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 22 inches. Root growth is severely restricted by the fragipan, which is commonly at a depth of 18 to 24 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is moderate.

This soil has fair potential for farming, and most of the acreage is farmed. It has fair potential for some urban uses and good potential for grasses and trees.

This soil is moderately well suited to cultivated crops and to pasture and hay. Alfalfa is commonly short lived because of seasonal wetness and restricted root growth. The soil is droughty during some growing seasons because of the restricted root zone. Seasonal wetness and the hazard of erosion are the main limitations. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase. Grazing during periods of seasonal wetness often cuts up and compacts the surface layer and increases the erosion hazard.

This soil is suited to trees, but only a small acreage is wooded. The soil is managed for hardwoods and pines.

This soil is limited for most urban uses by a seasonal high water table that is perched above the fragipan. Capability subclass IIw.

11B—Buchanan fine sandy loam, 2 to 7 percent slopes. This gently sloping, somewhat poorly drained soil is on broad terraces along rivers and major streams. Slopes are smooth and about 100 to 500 feet long. Areas of this soil are commonly irregular in shape. They range from 2 to 50 acres or more.

Typically, the surface layer is very dark grayish brown fine sandy loam about 3 inches thick. The subsurface layer is brown and pale brown fine sandy loam and loam 8 inches thick. The subsoil is 33 inches thick. The upper 9 inches is yellowish brown sandy clay loam with light gray, strong brown, and brownish yellow mottles. The lower 24 inches is a fragipan of yellowish brown and brownish yellow clay loam and sandy clay loam with light gray and strong brown mottles. The substratum extends to a depth of more than 60 inches. It is gray, brownish yellow, and dark brown clay to a depth of 55 inches and is mottled, light gray fine sandy clay loam at a depth of more than 55 inches.

Included with this soil in mapping are small, intermingled areas of Cotaco, Monongahela, Purdy, and Allegheny soils that make up about 15 percent of this unit. Cotaco and Monongahela soils are similar to this Buchanan soil, Purdy soils are finer textured, and Allegheny soils are better drained. Also included are small areas of soils with a cobbly surface layer and small areas of neutral soils. These make up about 5 percent of this unit.

Permeability of this soil is moderate above and below the fragipan and slow in the fragipan. Available water capacity is medium. Runoff is medium. Tilth is good, but the soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 22 inches. Root growth is severely restricted by the fragipan, which is commonly at a depth of 18 to 24 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is moderate.

This soil has fair potential for farming, and most of the acreage is farmed. It has fair potential for some urban uses and good potential for grasses and trees.

This soil is moderately well suited to cultivated crops and to pasture and hay. Alfalfa is commonly short lived because of seasonal wetness and restricted root growth. The soil is droughty during some growing seasons because of the restricted root zone. The hazard of erosion and downslope seepage during wet periods are limitations. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soils are cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer to offset acidity and increase fertility are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase. Grazing during periods of seasonal wetness cuts up and compacts the surface layer and increases the erosion hazard.

This soil is suited to trees, but only a small acreage is wooded. The soil is managed for hardwoods and pines.

This soil is limited for many urban uses by a seasonal high water table. Capability subclass IIe.

12B—Buchanan cobbly fine sandy loam, 0 to 7 percent slopes. This nearly level to gently sloping, somewhat poorly drained soil is on broad, smooth terraces. Slopes are smooth and about 100 to 1,000 feet long. Areas of this soil parallel the major streams and rivers and are irregularly shaped. They range from 1 to 50 acres or more.

Typically, the surface layer is very dark grayish brown cobbly fine sandy loam about 3 inches thick. The subsurface layer is brown and pale brown fine sandy loam and loam 8 inches thick. The subsoil is 33 inches thick. The upper 9 inches is yellowish brown sandy clay loam with light gray, strong brown, and brownish yellow mottles. The lower 24 inches is a fragipan of yellowish brown and brownish yellow clay loam and sandy clay loam with light gray and strong brown mottles. The substratum extends to a depth of more than 60 inches. It is gray, brownish yellow, and dark brown clay to a depth of 55 inches and is mottled, light gray fine sandy clay loam at a depth of more than 55 inches.

Included with this soil in mapping are small, intermingled areas of Cotaco, Monongahela, Purdy, and Allegheny soils that make up about 15 percent of this unit. Cotaco and Monongahela soils are similar to this Buchanan soil, Purdy soils are finer textured, and Allegheny soils are better drained. Also included are small areas of neutral soils. These make up about 6 percent of this unit.

Permeability of this soil is moderate above the fragipan and slow in the fragipan. Available water capacity is low. Runoff is medium. Tilth is fair. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone typically extends to a depth of about 21 inches. Root growth is severely restricted by the fragipan, which is commonly at a depth of 18 to 24 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is moderate.

This soil has fair potential for farming, and most of the acreage is wooded. It has poor potential for most urban uses, fair potential for grasses, and good potential for trees.

This soil is moderately well suited to cultivated crops and to pasture and hay. Alfalfa is commonly short lived because of seasonal wetness and restricted root growth. The soil is droughty during the growing season. Cobblestones and pebbles damage tillage equipment and interfere with planting. The hazard of erosion and downslope seepage during wet periods are major limitations. Increasing and maintaining organic matter content is a major management concern. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer as needed are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase. Grazing during periods of seasonal wetness cuts up and compacts the surface layer and increases the erosion hazard.

This soil is suited to trees, and a moderate acreage is wooded. The soil is managed for pines and hardwoods.

This soil is limited for most urban purposes by a seasonal high water table and the slow permeability of the fragipan. Capability subclass IIe.

13C—Buchanan-Monongahela loams, 7 to 15 percent slopes. These sloping, moderately well drained to somewhat poorly drained soils are so intermingled that it was not practical to map them separately. The soils are mostly on narrow breaks between broad terraces along major streams and rivers. Slopes are slightly concave and about 50 to 400 feet long. Areas of this complex are mainly long and narrow. They range from 1 to 30 acres or more. This unit is about 45 percent Buchanan soils, 35 percent Monongahela soils, and 20 percent included soils.

Typically, the Buchanan soils have a surface layer of very dark grayish brown fine sandy loam about 3 inches thick. The subsurface layer is brown and pale brown fine sandy loam and loam 8 inches thick. The subsoil is 33

inches thick. The upper 9 inches is yellowish brown sandy clay loam with light gray, strong brown, and brownish yellow mottles. The lower 24 inches is a fragipan of yellowish brown and brownish yellow clay loam and sandy clay loam with light gray and strong brown mottles. The substratum extends to a depth of more than 60 inches. It is gray, brownish yellow, and dark brown clay to a depth of 55 inches and is mottled, light gray fine sandy clay loam at a depth of more than 55 inches.

Typically, the Monongahela soils have a surface layer of yellowish brown fine sandy loam about 9 inches thick. The subsoil is 43 inches thick. The upper 19 inches is yellowish brown sandy clay loam with a few very pale brown streaks in the lower part. The lower 24 inches is a fragipan of yellowish brown sandy clay loam and gravelly sandy clay loam with light gray, very pale brown, or strong brown mottles. The substratum is mixed yellowish brown, strong brown, and light brownish gray light clay loam to a depth of more than 60 inches.

Included with these soils in mapping are small, intermingled areas of Allegheny, Cotaco, and Purdy soils. These included soils have a surface layer of dark brown, yellowish brown, and dark gray fine sandy loam or silt loam. They make up about 20 percent of this unit.

Permeability of these soils is moderate above the fragipan and slow in the fragipan. Available water capacity is medium. Runoff is medium to rapid. Tilth is good, but these soils are low in natural fertility and organic matter content. The subsoil of each has a low shrink-swell potential. The root zone extends to a depth of about 20 inches in the Buchanan soil and 28 inches in the Monongahela soil. Root growth is severely restricted by the fragipan, which is commonly at a depth of about 18 to 30 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is moderate.

These soils have fair potential for farming, and most of the acreage is farmed. They have poor potential for most urban uses and good potential for grasses and trees.

These soils are moderately well suited to cultivated crops and to pasture and hay. Alfalfa is commonly short lived because of seasonal wetness and restricted root growth. The soils are droughty during some growing seasons because of the restricted root zone. The hazard of erosion and downslope seepage during wet periods are limitations. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soils are cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer as needed are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase. Grazing during periods of seasonal wetness cuts up and compacts the surface layer and increases the erosion hazard.

These soils are suited to trees, but only a small acreage is wooded. The soils are managed for hardwoods and pines.

These soils are limited for most urban uses by a seasonal high water table. Capability subclass IIIe.

14—Buckton silt loam. This deep, nearly level to very gently sloping, well drained soil is on flood plains bordering the major streams and rivers. Slopes range from 0 to 4 percent, and are smooth, and are 150 to 300 feet long. Areas of this soil commonly are long and narrow. They range from 3 to 40 acres.

Typically, the surface layer is dark brown silt loam about 7 inches thick. The subsoil is dark brown and very dark grayish brown, friable loam and silt loam about 47 inches thick. The substratum is dark brown silt loam to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Udifluvents and Wheeling and Millrock soils that make up about 10 to 15 percent of this unit. The Udifluvents generally are in low areas. The Wheeling soils are on slightly elevated areas, and the Millrock soils are generally next to the stream.

Permeability and available water capacity are moderate in this soil. Runoff is slow. Tilth is good. The soil is high in natural fertility and moderate in organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The surface layer and subsoil are commonly neutral to moderately alkaline. This soil is generally flooded during periods of heavy rainfall.

This soil has a good potential for farming, and much of the acreage is in pasture. Potential of this soil for urban uses is poor. The soil has good potential for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay. Flooding is the main hazard. Maintaining organic matter content is a major management concern. The use of fertilizer helps to maintain fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system improve tillage and prevent scouring. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of fertilizer are suitable practices of pasture management.

This soil is well suited to trees, but only a very small acreage is wooded. The soil is managed for hardwoods and pines.

This soil is severely limited for urban uses by flooding. Capability subclass IIw.

15B—Burketown fine sandy loam, 0 to 7 percent slopes. This deep, nearly level to gently sloping, moderately well drained soil is on broad terraces along the major streams and rivers. Slopes are smooth and about 300 to 1,200 feet long. Areas of this soil are commonly irregular in shape. They range from 5 to more than 100 acres.

Typically, the surface layer is brown and pale brown fine sandy loam about 15 inches thick. The subsoil is 33 inches thick. The upper 19 inches is yellowish brown fine sandy loam. The lower 14 inches is a fragipan of mottled, pale brown heavy fine sandy loam. Underlying the fragipan is yellowish red clay loam to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Monongahela, Buchanan, and Millrock soils that make up about 15 percent of this unit. The Monongahela and Buchanan soils are similar to this Burketown soil. The Millrock soils are flooded.

Permeability is slow in this soil, and available water capacity is low. Runoff is slow to medium. Tilth is good, but the soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential, but in places the soil at a depth of more than 48 inches is moderate. The root zone extends to a depth of about 34 inches. Root growth is severely restricted by the fragipan, which is commonly at a depth of 25 to 36 inches. The surface layer and subsoil are commonly very strongly acid to medium acid unless lime has been applied. The hazard of erosion is moderate.

This soil has fair potential for farming, and most of the acreage is farmed. It has poor potential for most urban uses. It has a good potential for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay. Alfalfa is commonly short lived because of seasonal wetness and restricted root growth. The soil is droughty during the growing season. Controlling erosion and increasing fertility are major management concerns. The use of lime and fertilizer help to offset acidity and increase fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer to offset acidity and increase fertility are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase. Grazing during periods of seasonal wetness often cuts up and compacts the surface layer and increases the erosion hazard.

This soil is suited to trees, but only a small acreage is wooded. The soil is managed for pines and hardwoods.

This soil is severely limited for most urban uses by a seasonal high water table. Capability subclass IIe.

15C—Burketown fine sandy loam, 7 to 15 percent slopes. This deep, sloping, moderately well drained soil is on terrace breaks along major streams and rivers. Slopes are smooth and about 100 to 400 feet long. Areas of this soil are commonly irregular in shape. They range from 2 to more than 30 acres.

Typically, the surface layer is brown and pale brown fine sandy loam about 15 inches thick. The subsoil is 33 inches thick. The upper 19 inches is yellowish brown fine sandy loam. The lower 14 inches is a fragipan of mottled, pale brown heavy fine sandy loam. Underlying the fragipan is a substratum of yellowish red clay loam to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Monongahela, Buchanan, and Sherando soils. These included soils have a surface layer of pale brown or yellowish brown sandy loam or loam and make up about 15 percent of this unit.

Permeability is slow in this soil, and available water capacity is low. Runoff is slow to medium. Tilth is good, but the soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 34 inches. Root growth is severely restricted by the fragipan, which is commonly at a depth of 25 to 36 inches. The surface layer and subsoil are commonly very strongly to medium acid unless lime has been applied. The hazard of erosion is severe.

This soil has fair potential for farming, and most of the acreage is farmed. It has poor potential for most urban uses and good potential for grasses and trees.

This soil is moderately well suited to cultivated crops and to pasture and hay. Alfalfa is commonly short lived because of seasonal wetness and restricted root growth. The soil is droughty during the growing season. Controlling erosion is a major management concern. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase. Grazing during periods of seasonal wetness often cuts up and compacts the surface layer and increases the erosion hazard.

This soil is suited to trees, but only a small acreage is wooded. The soil is managed for pines and hardwoods.

This soil is limited for most urban uses by a seasonal high water table. Capability subclass IIIe.

16E—Cataska slaty silt loam, 15 to 45 percent slopes. This moderately steep to steep, moderately deep, excessively drained soil is on hilly, dissected foot slopes on the western side of the Blue Ridge Mountains. Slopes are commonly complex and are about 100 to 600 feet long. Areas of this soil are irregularly shaped and range from 10 to 100 acres or more.

Typically, the surface layer is yellowish brown slaty silt loam about 7 inches thick. The subsoil is yellowish brown very slaty loam about 10 inches thick. The substratum is 7 inches thick. It is fractured slate with yellowish brown silt loam soil material in the cracks. Hard slate and phyllite are at a depth of 24 inches.

Included with this soil in mapping are small areas of Hartleton, Hazleton, and Unison soils that make up about 15 percent of this unit. Also included are small spots of stony or very stony soils and of rock outcrops. These make up less than 5 percent of the unit.

Permeability is moderate in this soil, and available water capacity is low. Runoff is rapid. Tilth is fair, but the soil is low in natural fertility and organic matter content. The subsoil is nonplastic and has a low shrink-swell potential. The root zone extends to a depth of about 24 inches, but root growth is typically restricted at a depth of about 17 inches by a very high content of coarse fragments. The surface layer and the subsoil are commonly very strongly acid. This soil is droughty during the growing season.

This soil has poor potential for farming, and very little of the acreage is farmed. It has poor potential for most urban uses, poor potential for grasses, and fair potential for trees.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures and deferment of grazing are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is suited to trees, and most of the acreage is wooded. The soil is managed for pines and hardwoods. The use of logging equipment is limited by slope.

The soil is limited for urban purposes by slope and depth to bedrock. Capability subclass VIIs.

16F—Cataska slaty silt loam, 45 to 70 percent slopes. This very steep, moderately deep, excessively drained soil is on highly dissected foot slopes on the western side of the Blue Ridge Mountains. Slopes are commonly complex and about 100 to 600 feet long. Areas of this soil are irregularly shaped and range from 10 to 100 acres or more.

Typically, the surface layer is a yellowish brown slaty silt loam about 7 inches thick. The subsoil is a yellowish brown very slaty loam about 10 inches thick. The substratum is 7 inches thick. It is fractured slate with yellowish brown silt loam soil material in the cracks. Hard slate and phyllite are at a depth of 24 inches.

Included with this soil in mapping are small areas of Hartleton and Hazleton soils that have a surface layer of light yellowish brown sandy loam or yellowish brown fine sandy loam. These included soils make about 10 percent of this unit. Also included are small spots of stony or very stony soils and of rock outcrops. These make up less than 10 percent of the unit.

Permeability is moderate in this soil, and available water capacity is low. Runoff is very rapid. The soil is low in natural fertility and organic matter content. The subsoil is nonplastic and has a low shrink-swell potential. The root zone extends to a depth of about 24 inches, but root growth is typically restricted at a depth of about 17 inches by a very high content of coarse fragments. The surface layer and the subsoil are commonly very strongly acid. Bedrock is generally at a depth of 20 to 30 inches. This soil is droughty during the growing season.

This soil is not suited to farming, and none of the acreage is farmed. It has poor potential for most urban uses, very poor potential for grasses, and fair potential for trees.

This soil is suited to trees, and most of the acreage is wooded. The soil is managed for pines and hardwoods. The use of logging equipment is limited by slope.

This soil is limited for urban purposes by slope and depth to bedrock. Capability subclass VIIs.

17E—Cataska very stony silt loam, 25 to 50 percent slopes. This steep to very steep, excessively drained soil is on highly dissected slopes on the western side of the Blue Ridge Mountains. Slopes are commonly complex and are about 100 to 1,000 feet long. Areas of this soil are irregularly shaped and range from 100 to 2,000 acres or more. Stones and boulders cover 3 to 15 percent of the surface of this soil.

Typically, the surface layer is yellowish brown slaty silt loam about 7 inches thick. The subsoil is yellowish brown very slaty loam about 10 inches thick. The substratum is about 7 inches thick. It is fractured slate with yellowish brown silt loam soil material in the cracks. Hard slate and phyllite are at a depth of 24 inches.

Included with this soil in mapping are small areas of Hartleton and Hazleton soils that make about 15 percent of this unit. Also included are small spots of stony soils and of rock outcrops. These make up less than 5 percent of the unit.

Permeability is moderate in this soil, and available water capacity is low. Runoff is very rapid. The soil is low in natural fertility and organic matter content. The subsoil is nonplastic and has a low shrink-swell potential. The root zone extends to a depth of about 24 inches, but root growth is typically restricted at a depth of about 17 inches by a very high content of coarse fragments. The surface layer and the subsoil are commonly very strongly acid. Bedrock is commonly at a depth of 20 to 30 inches. This soil is droughty during the growing season.

This soil is not suited for farming, and none of the acreage is farmed. It has poor potential for most urban

uses, very poor potential for grasses, and fair potential for trees.

The soil is suited to trees, and most of the acreage is wooded. The soil is managed for pines and hardwoods. The use of logging equipment is limited by slope.

This soil is limited for urban purposes by slope and depth to bedrock. Capability subclass VIIs.

18—Chagrin loam. This deep, nearly level to very gently sloping, well drained soil is on flood plains. Slopes range from 0 to 4 percent. Areas of this soil border the major streams and rivers and are commonly long and narrow. The areas range from 3 to 50 acres or more.

Typically, the surface layer is dark brown loam about 11 inches thick. The subsoil is brown loam about 37 inches thick. The substratum is brown fine sandy loam or sandy loam to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Fluvaquents and Wheeling, Buckton, and Tioga soils that have a surface layer of brown or dark brown silt loam or fine sandy loam. They make up about 15 percent of this unit. Also included are small gravelly or cobbly areas that make up less than 5 percent of the unit.

Permeability is moderate in this soil, and available water capacity is moderate. Runoff is slow to medium. Tilth is good. The soil is high in natural fertility and moderate in organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly medium acid to neutral unless lime has been applied. This soil is flooded for brief periods almost every year.

This soil has good potential for farming, and most of the acreage is farmed. It has poor potential for urban use. It has a very good potential for grasses and trees.

This soil is suited to cultivated crops and to hay and pasture. Flooding is the major hazard on this soil. Increasing organic matter content is a main management concern. The use of lime and fertilizer helps to offset acidity and maintain fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to improve tillage and prevent scouring. Crop residue should be kept at or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazards of scouring and erosion increase.

The soil is well suited to trees, but only a very small acreage is wooded. The soil is managed for hardwoods and pines.

This soil is limited for most urban purposes by flooding. Capability subclass IIw.

19—Chavies fine sandy loam. This nearly level to very gently sloping, well drained soil is on broad, low lying terraces along the larger streams in the county. Areas of this soil are commonly elongated. They range from 10 to more than 100 acres. Slopes range from 0 to 4 percent.

Typically, the surface layer is dark brown fine sandy loam about 14 inches thick. The subsoil is mostly reddish brown, friable fine sandy loam about 20 inches thick. The substratum is reddish brown loamy fine sand or very cobbly loamy sand to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Allegheny, Craigsville, and Philo soils that make up about 20 to 25 percent of this unit. Allegheny soils are commonly on higher lying areas near uplands, and Craigsville and Philo soils are along drainageways and channels on flood plains. Also included are small spots of very gravelly and cobbly soils in abandoned channels. These soils make up about 5 percent of the unit.

Permeability of this soil is moderately rapid, and available water capacity is moderate. Runoff is slow. Tilth is good, but the soil is moderate in natural fertility and low in organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly medium acid to strongly acid unless lime has been applied. The hazard of erosion is slight. The soil is sometimes flooded for very brief periods under abnormally high floodwater conditions.

This soil has good potential for farming, and most of the acreage is farmed. It has poor potential for most urban uses because of the hazard of flooding. It has good potential for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay. Increasing organic matter content is a main management concern. The use of lime and fertilizer helps to offset acidity and maintain fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to increase organic matter content and maintain tilth. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

The soil is well suited to trees, but only a small acreage is wooded. The soil is managed mostly for hardwoods.

This soil is limited for many urban purposes mostly by flooding. There is a hazard of groundwater pollution from septic tank absorption fields. Capability subclass IIw.

20B2—Chilhowie silty clay loam, 2 to 7 percent slopes, eroded. This gently sloping, well drained soil is on weakly convex ridgetops and knolls. Slopes are smooth, commonly complex, and about 100 to 400 feet long. Many areas of this soil have shallow drainageways about 100 to 200 feet apart. Areas of this soil commonly

are long and winding. They range from about 5 to 75 acres.

Typically, the surface layer is brown silty clay loam about 7 inches thick. The subsoil is strong brown, firm, sticky clay about 10 inches thick. The substratum is yellowish brown very shaly clay 5 inches thick. Interbedded calcareous shale and limestone are at a depth of 22 inches.

Included with this soil in mapping are small areas of Edom soils that make up about 10 percent of this unit. Also included are small areas of soils that are less than 20 inches deep to bedrock, small wet spots, small areas of rock outcrops, and small severely eroded spots. These make up about 10 percent of this unit.

Permeability of this soil is slow, and available water capacity is low. Runoff is medium. Tilth is fair under optimum moisture content, but the plow layer is hard and breaks up in clods when the soil is dry and sticks to plowshares when the soil is wet. The soil is high in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 22 inches. The surface layer and subsoil are commonly slightly acid to mildly alkaline, and the substratum is commonly moderately alkaline. Bedrock is at a depth of about 2 to 3 1/2 feet. The hazard of erosion is severe.

This soil has fair potential for farming, and much of the acreage is farmed. It has poor potential for many urban uses and fair potential for grasses and trees.

This soil is moderately well suited to cultivated crops and to pasture and hay. It is droughty during the growing season. Controlling erosion and increasing organic matter content are major management concerns. The use of fertilizer helps to maintain fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of fertilizer are suitable practices of pasture management. If the pastures are overgrazed, runoff and the hazard of erosion increase.

The soil is moderately well suited to trees, but only a small acreage is wooded. The soil is managed mostly for pines. The use of timber equipment is limited by the surface layer, which becomes soft and slippery when wet.

The soil is limited for many urban purposes by slow permeability and depth to bedrock. Capability subclass IIIe.

20C2—Chilhowie silty clay loam, 7 to 15 percent slopes, eroded. This sloping, well drained soil is on narrow, convex ridgetops, knolls, and sideslopes. Slopes are smooth, commonly complex, and about 100 to 800 feet long. Many areas of this soil have shallow drainageways about 100 to 200 feet apart. Areas of this soil commonly are long and winding. They range from about 5 to 100 acres or more.

Typically, the surface layer is brown silty clay loam about 7 inches thick. The subsoil is strong brown, firm, sticky clay about 10 inches thick. The substratum is yellowish brown very shaly clay 5 inches thick. Interbedded calcareous shale and limestone are at a depth of 22 inches.

Included with this soil in mapping are small, smooth areas of Edom soils that make up about 10 to 15 percent of this unit. Also included are small areas of soils that are less than 20 inches deep to bedrock, small wet spots, small areas of rock outcrop, and small severely eroded spots. These make up about 10 percent of this unit.

Permeability of this soil is slow, and available water capacity is low. Runoff is medium to rapid. Tilth is fair under optimum moisture content, but the plow layer is hard and breaks up in clods when the soil is dry and sticks to plow shares when the soil is wet. The soil is high in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 22 inches. The surface layer and subsoil are commonly slightly acid to mildly alkaline, and the substratum is commonly moderately alkaline. Bedrock is at a depth of about 2 to 3 1/2 feet. The hazard of erosion is severe.

This soil has fair potential for farming, and much of the acreage is farmed. It has poor potential for many urban uses and fair potential for grasses and trees.

This soil is poorly suited to cultivated crops. It is better suited to pasture and hay. It is droughty during the growing season. Controlling erosion and increasing organic matter content are major management concerns. The use of fertilizer helps to maintain fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is moderately well suited to trees, but only a small acreage is wooded. The soil is managed mostly for pines. The use of harvesting equipment is limited by the surface layer, which becomes soft and slippery when wet.

The soil is limited for many urban purposes by slow permeability and depth to bedrock. Capability subclass IVe.

21B3—Chilhowie shaly silty clay loam, 2 to 7 percent slopes, severely eroded. This gently sloping, well drained soil is on weakly convex ridgetops and knolls. Slopes are smooth, commonly complex, and about 100 to

400 feet long. Many areas of this soil have shallow drainageways about 100 to 200 feet apart. Areas of this soil commonly are long and winding. They range from about 5 to 100 acres.

Typically, the surface layer is brown shaly silty clay loam about 5 inches thick. The subsoil is strong brown, firm, sticky clay about 8 inches thick. The substratum is yellowish brown very shaly clay 9 inches thick. Interbedded calcareous shale and limestone are at a depth of 22 inches.

Included with this soil in mapping are small areas of Edom soils that make up about 10 to 15 percent of this unit. Also included are small areas of soils that are less than 20 inches deep to bedrock, small wet spots, and small severely eroded spots. These make up about 5 percent of the unit.

Permeability of this soil is slow, and available water capacity is low. Runoff is medium to rapid. Tilth is fair under optimum moisture content, but the plow layer is hard and breaks up in clods when the soil is dry and sticks to plowshares when the soil is wet. The soil is high in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 22 inches. The surface layer and subsoil are commonly slightly acid to mildly alkaline, and the substratum is commonly moderately alkaline. Bedrock is at a depth of about 2 to 3 1/2 feet. The hazard of erosion is severe.

This soil has fair potential for farming, and much of the acreage is farmed. It has poor potential for many urban uses and fair potential for grasses and trees.

This soil is moderately well suited to cultivated crops and to pasture and hay. It is droughty during the growing season. Controlling erosion and increasing organic matter content are major management concerns. The use of fertilizer helps to maintain fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of fertilizer are suitable pasture management practices. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is moderately well suited to trees, but only a small acreage is wooded. The soil is managed mostly for pines. The use of harvesting equipment is limited by the surface layer, which becomes soft and slippery when wet.

This soil is limited for many urban purposes by slow permeability and depth to bedrock. Capability subclass IVe.

21C3—Chilhowie shaly silty clay loam, 7 to 15 percent slopes, severely eroded. This sloping, well drained soil is on narrow, convex ridgetops, knolls, and side slopes. Slopes are smooth, commonly complex, and about 100 to 800 feet long. Most areas of this soil have shallow drainageways about 100 to 200 feet apart. Areas of this soil commonly are long and winding. They range from about 5 to 60 acres or more.

Typically, the surface layer of this soil is brown shaly silty clay loam about 5 inches thick. The subsoil is strong brown, firm, sticky clay about 8 inches thick. The substratum is yellowish brown very shaly clay 9 inches thick. Interbedded calcareous shale and limestone are at a depth of 22 inches.

Included with this soil in mapping are small areas of Edom soils that make up about 10 to 15 percent of this unit. Also included are small areas of soils that are less than 20 inches deep to bedrock, small wet areas along drainageways, and small severely eroded spots. These make up about 5 percent of the unit.

Permeability of this soil is slow, and available water capacity is low. Runoff is rapid. Tilth is fair under the proper moisture content, but the plow layer is hard and breaks up in clods when the soil is dry and sticks to plowshares when the soil is wet. The soil is high in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 22 inches. The surface layer and subsoil are commonly slightly acid to mildly alkaline, and the substratum is commonly moderately alkaline. Bedrock is at a depth of about 2 to 3 1/2 feet. The hazard of erosion is severe.

This soil has a fair potential for farming, and much of the acreage is farmed. It has poor potential for many urban uses and fair potential for grasses and trees.

This soil is not suited to cultivated crops. It is better suited to pasture and hay. It is droughty during the growing season. Controlling erosion and increasing organic matter content are major management concerns. The use of fertilizer helps to maintain fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

The soil is moderately well suited to trees, but only a small acreage is wooded. The soil is managed mostly for pines. The use of timber harvesting equipment is limited by the surface layer, which becomes soft and slippery when wet.

This soil is limited for many urban purposes by slow permeability and depth to bedrock. Capability subclass VIe.

21D3—Chilhowie shaly silty clay loam, 15 to 25 percent slopes, severely eroded. This moderately steep, well drained soil is on convex side slopes of hills and ridges. Slopes are smooth to irregular, commonly complex, and about 300 to 800 feet long. Most areas of this soil have shallow drainageways about 100 to 200 feet apart. Areas of this soil commonly are long and winding. They range from about 5 to 150 acres or more.

Typically, the surface layer is brown shaly silty clay loam about 3 inches thick. The subsoil is strong brown, firm, sticky clay about 10 inches thick. The substratum is yellowish brown very shaly clay 9 inches thick. Interbedded calcareous shale and limestone are at a depth of 22 inches.

Included with this soil in mapping are small areas of Edom soils that make up about 10 to 15 percent of this unit. Also included are small areas of soils that are less than 20 inches deep to bedrock, small wet spots, small areas of rock outcrop, and small severely eroded spots. These make up about 10 percent of the unit.

Permeability of this soil is slow, and available water capacity is low. Runoff is very rapid. The soil is high in natural fertility and low in organic matter. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 22 inches. The surface layer and subsoil are commonly slightly acid to alkaline, and the substratum is commonly moderately alkaline. Bedrock is at a depth of about 2 to 3 1/2 feet. The hazard of erosion is severe.

This soil has fair potential for hay and pasture, and much of the acreage is farmed. It has poor potential for many urban uses and fair potential for grasses and trees.

This soil is not suited to cultivated crops. It is moderately well suited to pasture and hay. It is droughty during the growing season. Controlling erosion, increasing organic matter content, establishing and maintaining a mixture of grasses and legumes, and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, use of fertilizer and deferment of grazing are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is moderately well suited to trees, but only a small acreage is wooded. The soil is managed mostly for pines. The use of equipment is limited by the surface layer, which becomes soft and slippery when wet.

This soil is limited for many urban purposes by slope and depth to bedrock. Capability subclass VIe.

21E3—Chilhowie shaly silty clay loam, 25 to 45 percent slopes, severely eroded. This steep, well drained soil is on convex side slopes and the points of hills and ridges. Slopes are smooth to irregular, commonly complex, and about 300 to 900 feet long. Most areas of this soil have shallow drainageways about 100 to 200 feet apart. Shale and limestone outcrops are common. Areas commonly are long and winding. They range from about 5 to 100 acres or more.

Typically, the surface layer is brown shaly silty clay loam about 3 inches thick. The subsoil is strong brown, firm, sticky clay about 8 inches thick. The substratum is yellowish brown very shaly clay 10 inches thick. Interbedded calcareous shale and limestone are at a depth of 21 inches.

Included with this soil in mapping are small areas of Edom soils that make up about 10 percent of this unit. Also included are areas of soils that are less than 20 inches deep to bedrock, small narrow wet spots along drainageways, and small areas of extremely shaly and flaggy soils. These make up about 10 percent of the unit.

Permeability of this soil is slow, and available water capacity is low. Runoff is rapid. The soil is high in natural fertility and low in organic matter. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 21 inches. The surface layer and subsoil are commonly slightly acid to mildly alkaline, and the substratum is commonly moderately alkaline. Bedrock is at a depth of about 2 to 3 1/2 feet. The hazard of erosion is severe.

This soil has very poor potential for farming, and most of the acreage is in pasture or woods. It has poor potential for many urban uses and fair potential for grasses and trees.

This soil is poorly suited to pasture. It is droughty during the growing season. Controlling erosion, maintaining a mixture of grasses and legumes, and proper grazing are major pasture management concerns. Proper stocking helps in maintaining desirable grasses and legumes. Rotation of pastures and deferment of grazing are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is moderately well suited to trees, but only a small acreage is wooded. The soil is managed mostly for pines. The use of equipment is limited by the surface layer, which becomes soft and slippery when wet.

This soil is limited for many urban purposes by slope and depth to bedrock. Capability subclass VIIe.

22B2—Chilhowie-Edom complex, 2 to 7 percent slopes, eroded. These gently sloping, well drained soils are so intermingled that it was not practical to map them separately. The soils are on weakly convex knolls and narrow, weakly convex ridgetops. Slopes are smooth and complex and are about 150 to 300 feet long. Many of the larger areas of this unit have shallow drainageways about 100 to 300 feet apart. Areas commonly are long and winding. They range from 5 to 50 acres or more. This unit is about 40 percent Chilhowie soils, 40 percent Edom soils, and 20 percent included soils.

Typically, the surface layer of the Chilhowie soils is brown silty clay loam about 7 inches thick. The subsoil is strong brown, firm, sticky clay about 10 inches thick. The substratum is yellowish brown very shaly clay 5 inches thick. Interbedded calcareous shale and limestone are at a depth of 22 inches.

Typically, the surface layer of the Edom soils is yellowish brown silt loam about 8 inches thick. The subsoil is yellowish red silty clay loam and clay in the upper 16 inches. It is red, yellowish red, brownish yellow, and yellow clay in the lower 16 inches. The substratum is yellowish red, brownish yellow, and yellow very shaly silty clay loam to a depth of 60 inches.

Included with these soils in mapping are small, intermingled areas of Guernsey and Timberville soils. The Guernsey soils are on toe slopes, and the Timberville soils are along drainageways. Also included are small wet areas along drainageways, small spots of rock outcrop, small spots of severely eroded soils, and small areas of soils that are less than 20 inches deep to bedrock. Inclusions make up about 20 to 25 percent of the map unit.

Permeability of the Chilhowie soils is slow and of the Edom soils is moderately slow. The available water capacity of the Chilhowie soils is low and of the Edom soils is moderate. Runoff is medium. Tilth is fair under optimum moisture content, but the plow layer is hard and breaks up into clods when these soils are dry and sticks to plowshares when these soils are wet. The soils are moderate to high in natural fertility and low in organic matter content. The subsoil of each has a moderate shrink-swell potential. The root zone extends to a depth of about 22 inches in the Chilhowie soils and to about 60 inches in the Edom soils. The surface layer and subsoil of these soils are commonly strongly acid to mildly alkaline, and the substratum is medium acid to moderately alkaline. Bedrock is at a depth of about 2 to 3 1/2 feet in the Chilhowie soils and 3 1/2 to 5 feet or more in the Edom soils. The hazard of erosion is severe.

These soils have fair potential for farming, and much of the acreage is farmed. They have poor potential for many urban uses and fair potential for grasses and trees.

These soils are moderately well suited to cultivated crops and to pasture and hay. They are droughty during the growing season. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer helps to offset acidity and maintain fertility. If the soils are cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

These soils are moderately well suited to trees, but only a small acreage is wooded. The soils are managed mostly for pines. The use of harvesting equipment is limited by the surface layer of the Chilhowie soils, which becomes soft and slippery when wet.

These soils are limited for many urban purposes by slow to moderately slow permeability and depth to bedrock in places. Capability subclass IIIe.

22C2—Chilhowie-Edom complex, 7 to 15 percent slopes, eroded. These sloping, well drained soils are so intermingled that it was not practical to map them separately. The soils are on convex knolls, narrow convex ridgetops, and side slopes. Slopes are smooth and complex and are about 200 to 800 feet long. Many of the larger areas of this unit have shallow drainageways about 100 to 300 feet apart. Areas commonly are long and winding. They range from 5 to 75 acres or more. This unit is about 40 percent Chilhowie soils, 40 percent Edom soils, and 20 percent included soils.

Typically, the surface layer of the Chilhowie soils is brown silty clay loam about 7 inches thick. The subsoil is strong brown, firm, sticky clay about 10 inches thick. The substratum is yellowish brown very shaly clay 5 inches thick. Interbedded calcareous shale and limestone are at a depth of 22 inches.

Typically, the surface layer of the Edom soils is yellowish brown silt loam about 8 inches thick. The subsoil is yellowish red silty clay loam and clay in the upper 16 inches. It is a red, yellowish red, brownish yellow, and yellow clay in the lower 16 inches. The substratum is yellowish red, brownish yellow, and yellow very shaly silty clay loam to a depth of about 60 inches.

Included with these soils in mapping are small, intermingled areas of Guernsey and Timberville soils on foot slopes and along small drainageways. Also included are small wet areas along drainageways, small spots of rock outcrop, small spots of severely eroded soils, and small areas of soils that are less than 20 inches deep to bedrock. Inclusions make up about 20 percent of this unit.

Permeability of the Chilhowie soil is slow and of the Edom soils is moderately slow. The available water capacity of Chilhowie soils is low and of the Edom soils is medium. Runoff is medium to rapid. Tilth is fair at the optimum moisture content, but the plow layer is hard and breaks up into clods when the soils are dry and sticks to plowshares when the soils are wet. The soils are moderate to high in natural fertility and low in organic matter content. The subsoil of both soils has a moderate shrink-swell potential. The root zone extends to a depth of about 22 inches in the Chilhowie soils and about 60 inches in the Edom soils. The surface layer and subsoil of these soils are commonly strongly acid to mildly alkaline, and the substratum is medium acid to moderately alkaline. Bedrock is at a depth of about 2 to 3 1/2 feet in the Chilhowie soils and 3 1/2 to 5 feet or more in the Edom soils. The hazard of erosion is severe.

These soils have fair potential for farming, and much of the acreage is farmed. They have poor potential for many urban uses and fair potential for grasses and trees.

This complex is poorly suited to cultivated crops. It is better suited to close-growing crops and to pasture and hay. It is droughty during the growing season. Controlling

erosion and increasing organic matter content are management concerns. The use of lime and fertilizer helps to offset acidity and maintain fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

These soils are moderately well suited to trees, but only a small acreage is wooded. The soils are managed mostly for pines. The use of timber equipment is limited by the surface layer of the Chilhowie soils, which becomes soft and slippery when wet.

This complex is limited for many urban purposes by slow to moderately slow permeability and depth to bedrock in places. Capability subclass IVe.

22D2—Chilhowie-Edom complex, 15 to 25 percent slopes, eroded. These moderately steep, well drained soils are so intermingled that it was not practical to map them separately. The soils are on side slopes of hills and ridges. Slopes are smooth and complex and are about 300 to 800 feet long. Many of the larger areas of this unit have shallow drainageways about 100 to 300 feet apart. Areas of this unit commonly are long and winding. They range from 5 to 50 acres. This unit is about 50 percent Chilhowie soils, 30 percent Edom soils, and 20 percent included soils.

Typically, the surface layer of the Chilhowie soils is brown silty clay loam about 7 inches thick. The subsoil is strong brown, firm, sticky clay about 10 inches thick. The substratum is yellowish brown very shaly clay 5 inches thick. Interbedded calcareous shale and limestone are at a depth of 22 inches.

Typically, the surface layer of the Edom soil is yellowish brown silt loam about 8 inches thick. The subsoil is yellowish red silty clay loam and clay in the upper 16 inches. It is red, yellowish red, brownish yellow, and yellow clay in the lower 16 inches. The substratum is yellowish red, brownish yellow, and yellow very shaly silty clay loam to a depth of 60 inches.

Included with these soils in mapping are Timberville soils in small low areas adjacent to drainageways. Also included are small wet areas along drainageways, small spots of rock outcrop, small spots of severely eroded soils, and small areas of soils that are less than 20 inches deep to bedrock. Inclusions make up about 20 percent of this unit.

Permeability of the Chilhowie soils is slow and of the Edom soils is moderately slow. Available water capacity of the Chilhowie soils is low and of the Edom soils is medium. Runoff is rapid. The soils are moderate to high in natural fertility and low in organic matter content. The subsoil of both soils has a moderate shrink-swell potential. The root zone extends to a depth of about 22 inches in the Chilhowie soils and about 50 inches in the Edom soils. The surface layer and subsoil of these soils are commonly strongly acid to mildly alkaline, and the substratum is medium acid to moderately alkaline. Bedrock is at a depth of 2 to 3 1/2 feet in the Chilhowie soils and 3 1/2 to 5 feet in the Edom soils. The hazard of erosion is severe.

These soils have poor to fair potential for farming, but much of the acreage is farmed. They have poor potential for many urban uses and fair potential for grasses and trees.

These soils are not suited to cultivated crops but are moderately well suited to pasture and hay. They are droughty during the growing season. Controlling erosion, increasing organic matter content, establishing and maintaining a mixture of grasses and legumes, and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, the use of lime and fertilizer, and deferment of grazing are suitable practices of pasture management. If pastures are overgrazed, runoff and erosion increase.

These soils are moderately well suited to trees, but only a small acreage is wooded. The soils are managed mostly for pines. The use of harvest equipment is limited by the surface layer of the Chilhowie soils, which becomes soft and slippery when wet.

This complex is limited for many urban purposes by slope and depth to bedrock in places. Capability subclass VIe.

23C3—Chilhowie-Edom shaly silty clay loams, 7 to 15 percent slopes, severely eroded. These sloping, well drained soils are so intermingled that it was not practical to map them separately. The soils are on convex knolls; narrow, convex ridgetops; and side slopes. Slopes are smooth and complex and are about 200 to 800 feet long. Many of the larger areas have shallow drainageways about 50 to 100 feet apart. Areas of this unit are rectangular. They range from 5 to 50 acres or more. This unit is about 40 percent Chilhowie soils, 40 percent Edom soils, and 20 percent included soils.

Typically, the surface layer of the Chilhowie soils is brown shaly silty clay loam about 4 inches thick. The subsoil is strong brown, firm, sticky clay about 8 inches thick. The substratum is yellowish brown very shaly clay 10 inches thick. Interbedded calcareous shale and limestone are at a depth of 22 inches.

Typically, the surface layer of the Edom soils is yellowish brown shaly silt loam about 5 inches thick. The subsoil is yellowish red silty clay loam and clay in the upper 19 inches. It is red, yellowish red, brownish yellow, and yellow clay in the lower 16 inches. The substratum is yellowish red, brownish yellow, and yellow very shaly silty clay loam to a depth of about 60 inches.

Included with these soils in mapping are small, intermingled areas of Guernsey and Timberville soils on colluvial foot slopes or along small drainageways. Also included are small wet areas along drainageways, small spots of rock outcrop, and small areas of soils that are less than 20 inches deep to bedrock. Inclusions make up about 15 to 20 percent of this unit.

Permeability of the Chilhowie soils is slow and of the Edom soils is moderately slow. Available water capacity of the Chilhowie soils is low and of the Edom soils is medium. Runoff is medium to rapid. Tilth is fair at the optimum moisture content, but the plow layer is hard and breaks up into clods when the soils are dry and sticks to plowshares when the soils are wet. The soils are moderate to high in natural fertility and very low in organic matter content. The subsoil of both has a moderate shrink-swell potential. The root zone extends to a depth of about 22 inches in the Chilhowie soils and to about 60 inches in the Edom soils. The surface layer and the subsoil of these soils are commonly strongly acid to mildly alkaline, and the substratum is medium acid to moderately alkaline. Bedrock is at a depth of about 2 to 3 1/2 feet in the Chilhowie soils and 3 1/2 to 5 feet in the Edom soils. The hazard of erosion is severe.

These soils have poor to fair potential for farming, and much of the acreage is in pasture or woodland. They have poor potential for many urban uses and fair potential for grasses and trees.

These soils are poorly suited to cultivated crops. They are better suited to pasture and hay. They are droughty during the growing season. Controlling erosion, increasing organic matter content, establishing and maintaining a mixture of grasses and legumes, and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

These soils are moderately well suited to trees, but only a small acreage is wooded. The soils are managed mostly for pines. The use of timber harvesting equipment is limited by the surface layer of the Chilhowie soils, which becomes soft and slippery when wet.

This complex is limited for many urban purposes by slow to moderately slow permeability and depth to bedrock in places. Capability subclass IVe.

23E3—Chilhowie-Edom shaly silty clay loams, 15 to 45 percent slopes, severely eroded. These moderately steep to steep, well drained soils are so intermingled that it was not practical to map them separately. The soils are on side slopes of hills and ridges. Slopes are smooth and complex and are about 300 to 800 feet long. Many of the larger areas have shallow drainageways about 50 to 200 feet apart. Areas of this unit are rectangular. They range from 5 to 50 acres. This unit is about 50 percent Chilhowie soils, 30 percent Edom soils, and 20 percent included soils.

Typically, the surface layer of the Chilhowie soils is brown shaly silty clay loam about 3 inches thick. The subsoil is strong brown, firm, sticky clay about 8 inches thick. The substratum is yellowish brown very shaly clay 11 inches thick. Interbedded calcareous shale and limestone are at a depth of 22 inches.

Typically, the surface layer of the Edom soils is yellowish brown silt loam about 5 inches thick. The subsoil is yellowish red silty clay loam and clay in the upper 15 inches. It is red, yellowish red, brownish yellow, and yellow clay in the lower 20 inches. The substratum is yellowish red, brownish yellow, and yellow very shaly silty clay loam to depth of about 60 inches.

Included with these soils in mapping are small areas of Timberville soils along drainageways and in low spots. Also included are small wet areas along drainageways, small spots of rock outcrop, and small areas of soils that are less than 20 inches deep to bedrock. Inclusions make up about 15 to 20 percent of this unit.

Permeability of the Chilhowie soils is slow and of the Edom soils is moderately slow. Available water capacity of the Chilhowie soils is low and of the Edom soils is medium. Runoff is rapid. The soils are moderate to high in natural fertility and low in organic matter. The subsoil of each soil has a moderate shrink-swell potential. The root zone extends to a depth of about 22 inches in the Chilhowie soils and to about 50 inches in the Edom soils. The surface layer and subsoil of these soils are commonly strongly acid to mildly alkaline, and the substratum is medium acid to moderately alkaline. Bedrock is at a depth of about 2 to 3 1/2 feet in the Chilhowie soils and 3 1/2 to 5 feet in the Edom soils. The hazard of erosion is severe.

These soils have poor to fair potential for farming, and much of the acreage is in pasture or hay. They have poor potential for many urban uses and fair potential for grasses and trees.

These soils are not suited to cultivated crops. They are moderately well suited to pasture and hay. They are droughty during the growing season. Controlling erosion, increasing organic matter content, establishing and maintaining a mixture of grasses and legumes, and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, use of lime and fertilizer, and deferment of grazing are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

These soils are moderately well suited to trees, but only a small acreage is wooded. The soils are managed mostly for pines. The use of timber harvesting equipment is limited by the surface layer of the Chilhowie soils, which becomes soft and slippery when wet.

These soils are limited for many urban purposes by slope and depth to bedrock in places. Capability subclass VIIe.

24B2—Christian fine sandy loam, 2 to 7 percent slopes, eroded. This gently sloping, well drained soil is on convex ridgetops, hills, and side slopes. Slopes are smooth, commonly complex, and about 100 to 500 feet long. Many areas of this soil have shallow drainageways about 100 to 300 feet apart. Areas are rectangular or are elongated along the ridgetops. The areas range from 3 to 50 acres.

Typically, the surface layer is yellowish brown fine sandy loam about 7 inches thick. The subsoil is yellowish red clay loam and clay about 33 inches thick. The substratum extends to a depth of more than 60 inches. It is strong brown and yellowish brown loam and silt loam with pockets of yellowish red clay.

Included with this soil in mapping are small, intermingled areas of Frederick, Edom, and Timberville soils. The Frederick and Edom soils are on landscape positions similar to those of the Christian soils. The Timberville soils are in lower colluvial positions on the landscape. These included soils make up about 15 percent of the map unit. Also included are small severely eroded spots, sinkholes, small areas of rock outcrop, and small areas of soils with a fragipan. These make up about 5 percent of this unit.

Permeability of this soil is moderate, and available water capacity is medium. Runoff is medium. The soil can be easily tilled under optimum moisture content. It is medium in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of more than 60 inches. The surface layer of this soil is strongly acid to neutral, and the subsoil and substratum are strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is moderate.

This soil has a good potential for farming, and most of the acreage is farmed. It has good potential for many urban uses and for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer help to offset acidity and maintain fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and preventing overgrazing are pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is well suited to trees, but only a small acreage is wooded. The soil is managed mostly for pines and hardwoods. The use of timber harvesting equipment is limited by the clayey subsoil, which becomes soft and sticky when wet.

This soil is limited for many urban purposes by the clayey subsoil and low strength. Capability subclass IIe.

24C2—Christian fine sandy loam, 7 to 15 percent slopes, eroded. This sloping, well drained soil is on convex ridgetops, hills, and side slopes. Slopes are smooth, commonly complex, and about 100 to 500 feet long. Many areas of this soil have shallow drainageways about 100 to 300 feet apart. Areas are rectangular or are elongated along ridgetops. The areas range from 5 to 100 acres.

Typically, the surface layer is yellowish brown fine sandy loam about 7 inches thick. The subsoil is yellowish red clay loam and clay about 33 inches thick. The substratum extends to a depth of more than 60 inches. It is strong brown and yellowish brown loam and silt loam with pockets of yellowish red clay.

Included with this soil in mapping are small, intermingled areas of Frederick, Edom, and Timberville soils. The Frederick and Edom soils are on landscape positions similar to those of this Christian soil. The Timberville soils are in depressions and along drainageways. These included soils make up about 15 percent of this map unit. Also included are small severely eroded spots, sinkholes, small areas of rock outcrop, and small areas of soils with a fragipan. These make up about 15 percent of this unit.

Permeability of this soil is moderate, and available water capacity is medium. Runoff is medium to rapid. The soil can be easily tilled at optimum moisture content. It is medium in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of more than 60 inches. The surface layer of this soil is strongly acid to neutral, and the subsoil and substratum are strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil has a good potential for farming, and much of the acreage is farmed. It has good potential for many urban uses and for grasses and trees.

This soil is moderately well suited to cultivated crops and to pasture and hay. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer helps to offset acidity and maintain fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and preventing overgrazing are pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

The soil is well suited to trees, but only a small acreage is wooded. The soil is managed mostly for pines and hardwoods. The use of timber harvesting equipment is limited by the clayey subsoil, which becomes soft and sticky when wet.

The soil is limited for many urban purposes by a clayey subsoil, slope, and low strength. Capability subclass IIIe.

24D2—Christian fine sandy loam, 15 to 25 percent slopes, eroded. This moderately steep, well drained soil is on the side slopes of hills and ridges. Slopes are smooth, commonly complex, and about 100 to 500 feet long. Many areas of this soil have shallow drainageways about 50 to 200 feet apart. Areas of this soil are rectangular or are elongated along ridgetops. The areas range from 5 to 100 acres.

Typically, the surface layer is yellowish brown fine sandy loam about 7 inches thick. The subsoil is yellowish red clay loam and clay about 33 inches thick. The substratum extends to a depth of more than 60 inches. It is strong brown and yellowish brown loam and silt loam with pockets of yellowish red clay.

Included with this soil in mapping are small, intermingled areas of Frederick, Edom, and Timberville soils. The Frederick and Edom soils are on positions on the landscape similar to those of this Christian soil. Timberville soils are in depressional areas or along drainageways. These included soils make up about 15 percent of this map unit. Also included are small severely eroded spots, sinkholes, small areas of rock outcrop, and small areas of soils with a fragipan. These make up about 5 percent of this unit.

Permeability of this soil is moderate, and available water capacity is medium. Runoff is rapid. The soil can be easily tilled at optimum moisture content. It is medium in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of more than 60 inches. The surface layer of this soil is strongly acid to neutral, and the subsoil and substratum are strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil has poor potential for farming, and most of the acreage is in pasture or woods. It has poor potential for many urban uses and good potential for grasses and trees.

This soil is poorly suited to cultivated crops. It is well suited to pasture and hay. Controlling erosion, increasing organic matter content, establishing and maintaining a mixture of grasses and legumes, and preventing overgrazing are pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is well suited to trees, and a moderate acreage is wooded. The soil is managed mostly for pines and hardwoods. The use of timber harvesting equipment is limited by slope and the clayey subsoil, which becomes soft and sticky when wet.

This soil is limited for many urban purposes by slope. Capability subclass IVe.

24E2—Christian fine sandy loam, 25 to 45 percent slopes, eroded. This steep, well drained soil is on side slopes of ridges and knolls. Slopes are smooth, commonly complex, and about 100 to 600 feet long. Many areas of this soil have shallow drainageways about 50 to 300 feet apart. Areas are rectangular and range from 5 to 100 acres.

Typically, the surface layer is yellowish brown fine sandy loam about 7 inches thick. The subsoil is yellowish red clay loam and clay about 33 inches thick. The substratum extends to a depth of more than 60 inches. It is strong brown and yellowish brown loam and silt loam with pockets of yellowish red clay.

Included with this soil in mapping are small areas of Frederick soil, which makes up about 10 percent of this map unit. Also included are small severely eroded spots, sinkholes, small areas of rock outcrop, and small areas of soils with a fragipan. These make up about 10 percent of this unit.

Permeability of this soil is moderate, and available water capacity is medium. Runoff is rapid. The soil is medium in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of more than 50 inches. The surface layer of this soil is strongly acid to neutral, and the subsoil and substratum are strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is very severe if plant cover is removed.

This soil has poor potential for farming, and most of the acreage is in pasture or woodland. It has very low potential for many urban uses, fair potential for grasses, and good potential for trees.

This soil is not suited to cultivated crops and is poorly suited to pasture. Controlling erosion, increasing organic matter content, maintaining a mixture of grasses and legumes, and preventing overgrazing are pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is well suited to trees, and a large acreage is wooded. The soil is managed mostly for pines and hardwoods. The use of logging equipment is limited by slope.

This soil is limited for many urban purposes by slope. Capability subclass VIe.

25C2—Christian cherty fine sandy loam, 7 to 15 percent slopes, eroded. This sloping, well drained soil is on convex ridgetops, hills, and side slopes. Slopes are smooth, commonly complex, and about 100 to 300 feet long. Many areas of this soil have shallow drainageways about 100 to 200 feet apart. Areas are rectangular or are

elongated along ridgetops. They range from 3 to 50 acres or more.

Typically, the surface layer is yellowish brown cherty fine sandy loam about 7 inches thick. The subsoil is yellowish red clay loam and clay about 33 inches thick. The substratum extends to a depth of more than 60 inches. It is strong brown and yellowish brown loam and silt loam with pockets of yellowish red clay.

Included with this soil in mapping are small, intermingled areas of Frederick and Timberville soils, which make up about 10 percent of this map unit. Also included are small severely eroded spots, sinkholes, small areas of rock outcrop, and small areas of soils with a fragipan. These make up about 10 percent of this unit.

Permeability of this soil is moderate, and available water capacity is medium. Runoff is medium to rapid. Chert fragments interfere with tillage. The soil is medium in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of more than 60 inches. The surface layer of this soil is strongly acid to neutral, and the subsoil and substratum are strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil has a fair potential for farming, and most of the acreage is farmed. It has fair potential for many urban uses and good potential for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay. Chert fragments damage tillage equipment and interfere with planting. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer helps to offset acidity, and maintain fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and preventing overgrazing are pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is well suited to trees, but only a small acreage is wooded. The soil is managed mostly for pines and hardwoods. The use of harvesting equipment is limited by the clayey subsoil, which becomes soft and sticky when wet.

The soil is limited for many urban purposes by the clayey subsoil, cherty surface, low strength, and slope. Capability subclass IIIe.

25D2—Christian cherty fine sandy loam, 15 to 25 percent slopes, eroded. This moderately steep, well drained soil is on side slopes of hills and ridges. Slopes are smooth, commonly complex, and about 100 to 500 feet long. Many areas of this soil have shallow drainageways about 50 to 200 feet apart. Areas are rectangular or are elongated along ridgetops. They range from 3 to 100 acres or more.

Typically, the surface layer is yellowish brown cherty fine sandy loam about 7 inches thick. The subsoil is yellowish red clay loam and clay about 33 inches thick. The substratum extends to a depth of more than 60 inches. It is strong brown and yellowish brown loam and silt loam with pockets of yellowish red clay.

Included with this soil in mapping are small, intermingled areas of Frederick and Timberville soils. The Frederick soils are similar to this Christian soil, and the Timberville soils are commonly along drainageways. These included soils make up about 15 percent of this map unit. Also included are small severely eroded spots, sinkholes, small areas of rock outcrop, and small areas of soils with a fragipan. These make up about 10 percent of this unit.

Permeability of this soil is moderate, and available water capacity is medium. Runoff is rapid. Chert fragments interfere with tillage. The soil is medium in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of more than 60 inches. The surface layer of this soil is strongly acid to neutral, and the subsoil and substratum are strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil has poor to fair potential for farming, and most of the acreage is in pasture or woods. It has a poor potential for many urban uses and good potential for grasses and trees.

This soil is poorly suited to cultivated crops and moderately well suited to pasture and hay. Controlling erosion, increasing organic matter content, establishing and maintaining a mixture of grasses, and preventing overgrazing are pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is well suited to trees, and a moderate acreage is wooded. The soil is managed mostly for pines and hardwoods. The use of harvesting equipment is limited by slope and a clayey subsoil, which becomes soft and sticky when wet.

This soil is limited for many urban purposes mainly by slope. Capability subclass IVe.

26—Cotaco Variant silt loam. This nearly level to gently sloping, moderately well drained soil is primarily along intermittent drainageways on broad terraces. Slopes are smooth or slightly concave and are about 100 to 600 feet long. Areas of this soil are commonly irregular in shape. They range from 1 to 20 acres or more. Slopes are 0 to 7 percent.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The upper part of the subsoil is a brown silty clay 12 inches thick and has mottling in the lower

part. The lower part of the subsoil is mottled, dark grayish brown clay and silty clay to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Allegheny, Monongahela, and Purdy soils. The Allegheny soils are at a slightly higher elevation and are better drained than this Cotaco Variant soil. The Monongahela soils are similar to this Cotaco Variant soil, and the Purdy soils are finer textured. Included areas make up about 25 percent of this unit.

Permeability of this soil is moderate to moderately slow. Available water capacity is medium. Runoff is medium. Tilth is good, but the soil is low in natural fertility and organic matter content. The subsoil has a moderate shrink-swell potential and is sticky. The root zone extends to a depth of more than 60 inches, but root growth is restricted by a seasonal high water table at a depth of about 26 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is moderate.

This soil has fair potential for farming, and a minor acreage is farmed. It has fair potential for many urban uses, fair potential for grasses, and good potential for trees.

This soil is moderately well suited to cultivated crops and to pasture and hay. Alfalfa is commonly short lived because of seasonal wetness. The use of lime and fertilizer is suitable for this soil. The soil is droughty during the growing season. Controlling erosion and increasing organic matter content are management concerns. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase. Grazing during periods of seasonal wetness cuts up and compacts the surface layer and increases the erosion hazard.

This soil is suited to trees, and a large acreage is wooded. The soil is managed for hardwoods and pines.

This soil is limited for many urban purposes by a seasonal high water table in winter and spring. Capability subclass IIw.

27—Craigsville fine sandy loam. This deep, nearly level to very gently sloping, well drained soil is on low terraces adjacent to flood plains of major streams and rivers. Slopes are smooth and are 100 to 300 feet long. Areas of this soil are long and narrow. They range from 10 to 50 acres or more. Slopes are 0 to 4 percent.

Typically, the surface layer is dark grayish brown fine sandy loam about 5 inches thick. The subsoil is dark brown and reddish brown, friable gravelly sandy loam about 22 inches thick. The substratum is reddish brown very gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Chavies and Allegheny soils. These included soils have fewer cobblestones and pebbles than this Craigsville soil. They make up about 10 percent of this unit. A few small wet spots and cobbly or gravelly soils are also included. These make up about 5 percent of the unit.

Permeability is moderately rapid in this soil, and available water capacity is low. Runoff is slow. Tilth is good, and the soil is medium in natural fertility and low in organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches. The surface layer and subsoil are commonly slightly acid to strongly acid unless lime has been applied. This soil is rarely briefly flooded during periods of heavy rainfall. The hazard of erosion is slight.

This soil has fair potential for farming, and much of the acreage is in pasture or woodland. The soil has very low potential for most urban uses and good potential for grasses and trees.

This soil is moderately well suited to cultivated crops and suited to pasture and hay crop. Flooding is the major limitation. The soil is droughty during the growing season. Increasing organic matter content is a management concern. The use of lime and fertilizer helps to offset acidity and maintain natural fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is suited to trees, and a moderate acreage is wooded. The soil is managed for pines and hardwoods.

This soil is limited for many urban purposes by flooding. Capability subclass IIs.

28—Craigsville cobbly fine sandy loam. This deep, nearly level to very gently sloping, well drained soil is on low terraces adjacent to flood plains of major streams and rivers. Slopes are smooth and are 100 to 800 feet long. Areas of this soil are long and narrow. They range from 10 to 150 acres or more. Slopes are 0 to 4 percent.

Typically, the surface layer is dark grayish brown cobbly fine sandy loam about 5 inches thick. The subsoil is dark brown and reddish brown, friable gravelly sandy loam about 22 inches thick. The substratum is reddish brown very gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Udorthents and Chavies and Allegheny soils. These included soils have a surface layer of dark brown fine sandy loam or reddish brown very cobbly loamy sand. They make up about 15 percent of this unit. The Udorthents are generally adjacent to stream channels. The Allegheny soils are at a slightly higher elevation than this Craigsville soil. A few small wet spots and extremely cobbly and gravelly areas are also included. These make up about 10 percent of the unit.

Permeability is moderately rapid in this soil, and available water capacity is low. Runoff is slow. Tilth is good, but pebbles and cobbles interfere with tillage. The soil is medium in natural fertility and low in organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches. The surface layer and subsoil are commonly slightly acid to strongly acid unless lime has been applied. The hazard of erosion is slight. This soil is rarely briefly flooded during periods of heavy rainfall.

This soil has fair potential for farming, but much of the acreage is in pasture or woodland. It has very low potential for most urban uses and good potential for grasses and trees.

This soil is moderately well suited to cultivated crops and is suited to pasture and hay. Flooding is the major limitation. Cobblestones and pebbles damage tillage equipment and interfere with planting. This soil is droughty during the growing season. Increasing organic matter content is a management concern. The use of lime and fertilizer helps to offset acidity and maintain natural fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is suited to trees, and a moderate acreage is wooded. The soil is managed for pines and hardwoods.

This soil is limited for many urban purposes by flooding and a cobbly surface. Capability subclass IIIs.

29E—Drall extremely stony sandy loam, 15 to 45 percent slopes. This deep, moderately steep to steep, well drained to excessively drained soil is on upper side slopes of mountains and on mountaintops. Slopes are irregular, commonly complex, and 300 to 1,000 feet long. Areas of this soil are generally long and winding. Steep, intermittent drainageways commonly originate in areas of this soil. About 15 to 40 percent of the surface is covered by sandstone and quartzite stones. Areas of this soil range from 40 to 1,000 acres or more.

Typically, the surface layer is dark grayish brown channery sandy loam about 10 inches thick. The subsoil is yellowish brown very channery loamy sand 21 inches thick. The substratum is 27 inches thick. It is brownish yellow and yellow very channery or channery sand in the upper 21 inches and is yellowish brown clay loam in the lower 6 inches. Hard quartzite rock is at a depth of 58 inches.

Included with this soil in mapping are small, intermingled areas of Hazleton, Hartleton, Sherando, Cataska, and Leetonia soils that make up about 20 percent of this unit. Rubble land and massive rock outcrops make up about 25 percent of the unit.

Permeability is rapid in this soil, and available water capacity is very low. Runoff is very rapid. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 58 inches. The surface layer and the subsoil are commonly strongly acid to very strongly acid. Bedrock is at a depth of about 3 1/2 to 5 feet.

This soil has no potential for farming, and none of the acreage is farmed. It has poor potential for urban uses, poor potential for grasses, and fair potential for trees. Steep slopes and stoniness limit this soil for most uses.

Nearly all of the acreage of this soil is wooded. The soil is managed for hardwoods and pines. The use of timber equipment is limited by slope and stoniness. Capability subclass VIIs.

29F—Drall extremely stony sandy loam, 45 to 80 percent slopes. This deep, very steep, well drained to excessively drained soil is on upper side slopes of mountains and on mountaintops. Slopes are irregular, commonly complex, and 300 to 1,000 feet long. Areas of this soil are generally long and winding. Very steep, intermittent drainageways commonly originate in areas of this soil. About 15 to 40 percent of the surface is covered by sandstone and quartzite stones. Areas of this soil range from 40 to 2,000 acres or more.

Typically, the surface layer is dark grayish brown channery sandy loam about 10 inches thick. The subsoil is yellowish brown very channery loamy sand 21 inches thick. The substratum is 27 inches thick. The upper 21 inches is brownish yellow and yellow very channery or channery sand. The lower 6 inches is yellowish brown clay loam. Hard quartzite rock is at a depth of 58 inches.

Included with this soil in mapping are small, intermingled areas of Hazleton, Hartleton, Sherando, Cataska, and Leetonia soils. These soils are less sandy throughout than this Drall soil, and they make up about 20 percent of this unit. Rubble land and massive rock outcrops make up about 25 percent of the unit.

Permeability is rapid in this soil, and available water capacity is very low. Runoff is very rapid. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 58 inches. The surface layer and the

subsoil are commonly strongly acid to very strongly acid. Bedrock is at a depth of about 3 1/2 to 5 feet.

This soil has no potential for farming, and none of the acreage is farmed. It has a very low potential for urban uses, mostly because of the very steep slopes and extreme stoniness. It has poor potential for grasses and fair potential for trees.

Nearly all of the acreage of this soil is wooded. The soil is managed for hardwoods and pines. The use of timber harvesting equipment is limited by slope and stoniness. Capability class VIIs.

30B2—Edom silt loam, 2 to 7 percent slopes, eroded. This gently sloping, well drained soil is on convex knolls and ridges. Slopes are undulating and complex. Many of the larger areas have small drainageways. A few rock outcrops are on some areas of this soil. Areas of this soil are irregularly shaped and range from 3 to 40 acres.

Typically, the surface layer is yellowish brown silt loam about 8 inches thick. The upper part of the subsoil is yellowish red silty clay loam and clay 16 inches thick. The lower part of the subsoil is red, brown, or yellow clay 16 inches thick. The substratum is mixed red and yellow, strongly weathered shale to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Endcav, Chilhowie, Frederick, and Christian soils. Also included are small areas of wetter soils along small drainageways and small spots of severely eroded soils. Included areas make up about 10 to 20 percent of this unit.

Permeability of this soil is moderately slow, and available water capacity is medium. Runoff is medium. The soil can be easily tilled at optimum moisture content, but it is hard when dry and sticky when wet. The soil is moderate in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches. The soil is strongly acid to mildy alkaline in the upper part. In the lower part it is medium acid to neutral. The hazard of erosion is moderate.

This soil has good potential for farming, and most of the acreage is farmed. It has good potential for many urban uses and for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer is suitable for this soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is well suited to trees, but only a small acreage is wooded. The soil is managed mostly for white pine.

This soil is limited for many urban uses by moderately slow permeability, low strength, and moderate shrink-swell potential. Capability subclass IIe.

30C2—Edom silt loam, 7 to 15 percent slopes, eroded. This sloping, well drained soil is on shale uplands that are well dissected by drainageways. Slopes are rolling and complex. A few rock outcrops are in some areas. Areas of this soil are irregularly shaped and range from 3 to 50 acres.

Typically, the surface layer is yellowish brown silt loam about 8 inches thick. The upper part of the subsoil is yellowish red silty clay loam and clay 16 inches thick. The lower part of the subsoil is red, brown, or yellow clay 16 inches thick. The substratum is mixed red and yellow, strongly weathered shale to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Endcav, Chilhowie, Frederick, and Christian soils. Also included are small areas of wetter soils along small drainageways and small spots of severely eroded soils. Included areas make up about 10 to 20 percent of this unit.

Permeability of this soil is moderately slow, and available water capacity is medium. Runoff is medium to rapid. This soil can be easily tilled at optimum moisture content, but it is hard when dry and sticky when wet. The soil is moderate in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches. Reaction ranges from strongly acid to mildly alkaline in the upper part of the soil and from medium acid to neutral in the lower part. The hazard of erosion is severe.

This soil has a good potential for farming, and most of the acreage is farmed. It has good potential for many urban uses and for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay crops. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer is suitable for this soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer to offset acidity and maintain fertility are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is well suited to trees, but only a small acreage is wooded. The soil is managed mostly for white pine.

This soil is limited for many urban purposes by moderately slow permeability, low strength, and moderate shrink-swell potential. Capability subclass IIIe.

30D2—Edom silt loam, 15 to 25 percent slopes, eroded. This moderately steep soil is on side slopes of hills and ridges. Most of the larger areas are dissected by numerous drainageways. A few rock outcrops are in some areas. Areas of this soil are irregularly shaped and range from 3 to 40 acres.

Typically, the surface is yellowish brown silt loam about 8 inches thick. The upper part of the subsoil is yellowish red silty clay loam and clay 16 inches thick. The lower part of the subsoil is red, brown, or yellow clay 16 inches thick. The substratum is mixed red and yellow, strongly weathered shale fragments to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Chilhowie, Christian, and Frederick soils. Also included are long, narrow areas of wetter soils near drainageways, wet spots at the heads of drainageways, and small areas of severely eroded soils. Included areas make up about 10 to 20 percent of this unit.

Permeability of this soil is moderately slow, and available water capacity is medium. Runoff is rapid. The soil is easy to till at optimum moisture content, but slope interferes with tillage. The soil is hard when dry and sticky when wet. It is moderate in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches. Reaction ranges from strongly acid to mildly alkaline in the upper part of the soil and from medium to neutral in the lower part. The hazard of erosion is severe.

This soil has poor potential for cultivated crops. Most of the acreage is used for pasture. The soil has poor potential for many urban uses and good potential for grasses and trees.

This soil is poorly suited to cultivated crops. It is better suited to close-growing crops and to pasture and hay. Slope and the hazard of erosion are the main limitations. Increasing organic matter content is a management concern. The use of lime and fertilizer is suitable for this soil. If the soil is cultivated, minimum tillage, stripcropping, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is well suited to trees, but only a small acreage is wooded. The soil is managed mostly for white pine.

This soil is limited for most urban purposes by slope, moderately slow permeability, low strength, and moderate shrink-swell potential. Capability subclass IVe.

31B3—Edom silty clay loam, 2 to 7 percent slopes, severely eroded. This gently sloping, well drained soil is on convex knolls and ridges. Slopes are undulating and complex. Many of the larger areas have small drainageways. A few rock outcrops are in some areas. Areas of this soil are irregularly shaped and range from 3 to 20 acres.

Typically, the surface layer is yellowish red silty clay loam about 5 inches thick. The upper part of the subsoil is yellowish red silty clay loam and clay 19 inches thick. The lower part of the subsoil is red, brown, or yellow clay 16 inches thick. The substratum is mixed red and yellow, strongly weathered shale to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Endcav, Chilhowie, Frederick, and Christian soils. Also included are small areas of wetter soils along small drainageways. Included areas make up about 10 to 20 percent of this unit.

Permeability of this soil is moderately slow, and available water capacity is medium. Runoff is medium. The soil can be tilled at optimum moisture content, but it is hard when dry and sticky when wet. It is moderate in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches. The soil is strongly acid to mildly alkaline in the upper part. In the lower part it is medium acid to neutral. The hazard of erosion is severe.

This soil has fair potential for farming, and most of the acreage is farmed. It has good potential for many urban uses and for grasses and trees.

This soil is moderately well suited to cultivated crops and to pasture and hay. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer is suitable for this soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is well suited to trees, but only a small acreage is wooded. The soil is managed mostly for white pine.

This soil is limited for many urban purposes by moderately slow permeability, low strength, and moderate shrink-swell potential. Capability subclass IIIe.

31C3—Edom silty clay loam, 7 to 15 percent slopes, severely eroded. This sloping, well drained soil is on

shale uplands that are well dissected by drainageways. Slopes are rolling and complex. A few rock outcrops are in some areas of this soil. Areas of this soil are irregularly shaped and range from 1 to 15 acres.

Typically, the surface layer is yellowish red silty clay loam about 5 inches thick. The upper part of the subsoil is yellowish red silty clay loam and clay 19 inches thick. The lower part of the subsoil is red, brown, or yellow clay. The substratum is mixed red and yellow, strongly weathered shale to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Endcav, Chilhowie, Frederick, and Christian soils. Also included are small areas of wetter soils along small drainageways. Included areas make up about 10 to 20 percent of this unit.

Permeability of this soil is moderately slow, and available water capacity is medium. Runoff is rapid. The soil can be tilled at optimum moisture content, but it is hard when dry and sticky when wet. The soil is moderate in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches. Reaction ranges from strongly acid to mildly alkaline in the upper part of the soil and from medium acid to neutral in the lower part. The hazard of erosion is severe.

This soil has poor to fair potential for farming, and most of the acreage is in pasture or hay. It has good potential for many urban uses and for grasses and trees.

This soil is poorly suited to cultivated crops but is suited to pasture and hay. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer is suitable for this soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is well suited to trees, but only a small acreage is wooded. The soil is managed mostly for white pine.

This soil is limited for many urban purposes by moderately slow permeability, low strength, and moderate shrink-swell potential. Capability subclass IVe.

32C2—Edom-Rock outcrop complex, 0 to 15 percent slopes, eroded. This unit consists of nearly level to sloping, well drained soils and outcrops of limestone that are so intermingled that it was not practical to map them separately. The soils are on side slopes of hills and ridges. Slopes are commonly complex and 100 to 500 feet long. The areas of Rock outcrop are 10 to 30 feet apart. Areas of this unit are rectangular and range from 11 to 15 acres. The unit consists of about 55 percent Edom soils, 30 percent Rock outcrop, and 15 percent included soils.

Typically, the surface layer of the Edom soils is yellowish brown silt loam about 8 inches thick. The upper part of the subsoil is yellowish red silty clay loam and clay 16 inches thick. The lower part of the subsoil is red, brown, or yellow clay 16 inches thick. The substratum is mixed red and yellow, strongly weathered shale fragments to a depth of more than 60 inches.

Included with this unit in mapping are small, intermingled areas of Endcav, Chilhowie, and Frederick soils. Also included are small areas of wetter soils along small drainageways.

Permeability of the Edom soils is moderately slow, and available water capacity is medium. Runoff is medium to rapid. The soil is moderate in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches. The soil is strongly acid to mildly alkaline in the upper part. In the lower part it is medium acid to neutral.

This unit has poor potential for cultivation, and most of the acreage is in pasture. It has poor potential for many urban uses and good potential for grasses and trees.

This complex is not suited to cultivated crops and moderately well suited to pasture. Rock outcrop and the hazard of erosion are the major limitations for farming. Increasing organic matter content, maintaining a mixture of grasses and legumes, and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This unit is well suited to trees, and a moderate acreage is wooded. The soil is managed mostly for white pine.

This unit is limited for many urban purposes by Rock outcrop, moderately slow permeability, low strength, and moderate shrink-swell potential. Capability subclass VIs.

32E2—Edom-Rock outcrop complex, 15 to 45 percent slopes, eroded. This unit consists of moderately steep to steep, well drained soils and outcrops of limestone that are so intermingled that it was not practical to separate them in mapping. The soils are on side slopes of hills and ridges. Slopes are commonly complex and 100 to 300 feet long. The areas of Rock outcrop are 10 to 30 feet apart. Areas of this unit are rectangular or are elongated along ridges. The areas range from 1 to 25 acres. This unit is about 55 percent Edom soils, 30 percent Rock outcrop, and 15 percent included soils.

Typically, the surface layer of the Edom soils is yellowish brown silt loam about 8 inches thick. The upper part of the subsoil is yellowish red silty clay loam and clay 16 inches thick. The lower part of the subsoil is red, brown, or yellow clay 16 inches thick. The substratum is mixed

red and yellow, strongly weathered shale fragments to a depth of 60 inches or more.

Included with this unit in mapping are small, intermingled areas of Chilhowie and Frederick soils. The Frederick soils are deeper than the Edom soils, and the Chilhowie soils are shallower. Also included are long, narrow areas of wetter soils near drainageways, wet spots at the heads of drainageways, and small areas of severely eroded soils.

Permeability of the Edom soils is moderately slow, and available water capacity is medium. Runoff is rapid. The soils are moderate in natural fertility and low in organic matter content. The subsoil of the Edom soils has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches. Reaction ranges from strongly acid to mildly alkaline in the upper part of the soil and from medium acid to neutral in the lower part.

This unit has poor potential for farming. Most of the acreage is used for pasture or woodland. The unit has poor potential for many urban uses and good potential for grasses and trees.

This complex is not suited to cultivated crops and is poorly suited to pasture. Rock outcrop, steepness of slope, and the hazard of erosion are major limitations for farming. Increasing organic matter content, maintaining a mixture of grasses and legumes, and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures and deferment of grazing are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This unit is well suited to trees, and a moderate acreage is wooded. The soil is managed mostly for white pine. The use of timber harvesting equipment is limited by steep slopes.

This complex is limited for most urban purposes by Rock outcrop, steep slopes, moderately slow permeability, low strength, and moderate shrink-swell potential. Capability subclass VIIs.

33E—Elliber very cherty silt loam, 15 to 45 percent slopes. This deep, moderately steep to steep soil is on side slopes of cherty knolls and ridges. Slopes are commonly complex and 100 to 1,000 feet long. Areas of this soil are rectangular on the sides of knolls and elongated along ridges. The areas range from 5 to more than 50 acres.

Typically, the surface layer is light yellowish brown and pale brown very cherty silt loam about 11 inches thick. The subsoil is yellowish brown, very pale brown, and reddish yellow very cherty silt loam to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Nixa and Frederick soils. The Nixa soils are commonly on lower slopes, and they have a dense, compact subsoil. The Nixa and Frederick soils make up 10 percent of this unit. Also included are small bouldery areas that make up less than 5 percent of the unit.

Permeability is moderately rapid in this soil, and available water capacity is low. Runoff is rapid. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches. The surface layer and the subsoil are commonly strongly acid or very strongly acid.

This soil has poor potential for farming, and most of the acreage is in woodland. It has poor potential for many urban uses, poor potential for grasses, and good potential for trees.

This soil is not suited to cultivated crops and is poorly suited to pasture. The large amount of chert fragments, steepness of slopes, and the hazard of erosion are major limitations for farming. Increasing organic matter content is a management concern. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures and deferment of grazing are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

The soil is suited to trees, and a large acreage is wooded. The soil is managed mostly for hardwoods. The use of logging equipment is limited by slope.

This soil is limited for many urban purposes by slope, moderately rapid permeability, and the large amount of chert fragments. Capability subclass VIIs.

34F—Elliber and Jefferson very cherty soils, 45 to 70 percent slopes. This unit consists of deep, very steep, well drained soils on narrow side slopes adjacent to deep drainageways along the lower slopes of the Appalachian Mountains. Slopes are about 100 to 1,000 feet long. Areas are long and winding and range from 6 to more than 75 acres. The mapped acreage of this unit is about 35 percent Elliber very cherty silt loam, 35 percent Jefferson cobbly fine sandy loam, and 30 percent included soils. The soils in this unit were mapped together because use and management are similar. Some areas of this unit consist of Elliber soils, some consist of Jefferson soils, and some consist of both.

Typically, the surface layer of the Elliber soil is light yellowish brown and pale brown very cherty silt loam about 11 inches thick. The subsoil is yellowish brown, very pale brown, and reddish yellow very cherty silt loam to a depth of more than 60 inches.

Typically, the surface layer of the Jefferson soil is yellowish brown cobbly fine sandy loam about 13 inches thick. The subsoil is about 44 inches thick. It is friable, yellowish brown and strong brown sandy clay loam and clay loam and is mottled in the lower part. The substratum is mottled, strong brown very cobbly clay loam to a depth of more than 60 inches.

Included with these soils in mapping are small, intermingled areas of Frederick and Christian soils that have a high content of coarse fragments in the surface layer. Also included are small outcrops of limestone, small extremely cherty areas, and small areas of stony and very stony soils.

Permeability is moderately rapid in these soils. Available water capacity is low in the Elliber soil and medium in the Jefferson soil. Runoff is rapid. The soils are low in natural fertility and organic matter content. The subsoil of both has a low shrink-swell potential. The root zone extends to a depth of more than 60 inches. The surface layer and subsoil of these soils are commonly strongly acid or very strongly acid.

This unit has poor potential for farming or pasture, and most of the acreage is wooded. It has poor potential for most urban uses and good potential for trees.

These soils are suited to trees, and a large acreage is wooded. They are managed for pines and hardwoods. The use of logging equipment is restricted by very steep and generally uneven slopes, and logging roads, skid trails, and loading areas should be on the contour. This complex is limited for most urban uses by slope. Capability subclass VIIs.

35B2—Endcav silt loam, 2 to 7 percent slopes, eroded. This gently sloping, well drained soil is on concave lower side slopes of hills and ridges. Slopes are smooth, commonly complex, and about 100 to 500 feet long. Many areas of this soil have shallow drainageways about 100 to 300 feet apart. Areas of this soil are rectangular and range from 3 to 40 acres.

Typically, the surface layer is brown silt loam about 6 inches thick. The subsoil is yellowish brown silty clay loam and silty clay to a depth of 18 inches and is mottled, yellowish brown clay to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Chilhowie, Edom, and Frederick soils. The Chilhowie soils are shallower than this Endcav soil, and the Edom and Frederick soils are less plastic and have a redder hue. These inclusions make up about 10 to 15 percent of this unit. Also included are small wet spots, small spots of severely eroded soils, small areas of rock outcrop, and sinkholes. These make up about 5 percent of the unit.

Permeability of this soil is moderately slow, and available water capacity is medium. Runoff is medium. The soil can be easily tilled at optimum moisture content, but the plow layer is hard and breaks up in clods when the soil is dry and sticks to plowshares when the soil is wet. The soil is medium in natural fertility and low in organic matter content. The subsoil has a high shrink-swell potential and is sticky and plastic. The root zone extends to a depth of more than 60 inches. The soil is strongly acid to neutral. Bedrock is at a depth of 4 to 8 feet. The hazard of erosion is moderate.

The soil has a good potential for farming, and much of the acreage is farmed. It has poor potential for many urban uses and good potential for grasses and trees.

This soil is moderately well suited to cultivated crops and to pasture and hay. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer is suitable for this soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is well suited to trees, but only a small acreage is wooded. The soil is managed mostly for pines and hardwoods. The use of logging equipment is limited by the clayey subsoil, which becomes soft and sticky when wet.

This soil is limited for many urban purposes by moderately slow permeability and a high shrink-swell potential. Capability subclass IIe.

35C2—Endcav silt loam, 7 to 15 percent slopes, eroded. This sloping, well drained soil is on slightly concave side slopes of hills and ridges. Slopes are smooth, commonly complex, and about 100 to 600 feet long. Many areas of this soil have shallow drainageways about 100 to 300 feet apart. Areas are rectangular and range from 3 to 30 acres.

Typically, the surface layer is brown silt loam about 6 inches thick. The subsoil is yellowish brown silty clay loam and silty clay to a depth of 18 inches and is mottled, yellowish brown clay to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Chilhowie, Edom, and Frederick soils that make up about 10 to 15 percent of this unit. Also included are small wet spots, small spots of severely eroded soils, small areas of rock outcrop, and sinkholes. These make up about 5 percent of the unit.

Permeability of this soil is moderately slow, and available water capacity is medium. Runoff is medium to rapid. The soil can be easily tilled at optimum moisture content, but the plow layer is hard and breaks up in clods when the soil is dry and sticks to plowshares when the soil is wet. The soil is medium in natural fertility and low in organic matter content. The subsoil has a high shrink-swell potential. The root zone extends to a depth of more than 60 inches. The soil is strongly acid to neutral. Bedrock is at a depth of 4 to 8 feet. The hazard of erosion is severe.

The soil has fair potential for farming, and much of the acreage is farmed. It has poor potential for many urban uses and good potential for trees and grasses.

This soil is moderately well suited to cultivated crops and to pasture and hay. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer is suitable for this soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is well suited to trees, but only a small acreage is wooded. The soil is managed mostly for pines and hardwoods. The use of logging equipment is limited by the clayey subsoil, which becomes soft and sticky when wet.

The soil is limited for many urban purposes by moderately slow permeability and a high shrink-swell potential. Capability subclass IIIe.

36B2—Endcav silt loam, rocky, 2 to 7 percent slopes, eroded. This gently sloping, well drained soil is on convex ridgetops, hills, and side slopes. Slopes are smooth, commonly complex, and about 100 to 500 feet long. Many areas of this soil have shallow drainageways about 100 to 300 feet apart. Areas of this soil are rectangular and range from 5 to 70 acres. They have areas of rock outcrop 100 to 300 feet apart.

Typically, the surface layer is brown silt loam about 6 inches thick. The subsoil is yellowish brown silty clay loam and silty clay to a depth of 18 inches and is mottled, yellowish brown clay to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Chilhowie, Edom, and Frederick soils. These included soils have a surface layer of brown or yellowish brown silt loam or silty clay loam and make up about 10 to 15 percent of this unit. Also included are small wet spots, small spots of severely eroded soils, small areas of very rocky soils, and sinkholes. These make up about 5 percent of the unit.

Permeability of this soil is moderately slow, and available water capacity is moderate. Runoff is medium. The soil can be easily tilled under proper moisture content, but the plow layer is hard and breaks up in clods when the soil is dry and sticks to plowshares when the soil is wet. The soil is medium in natural fertility and low in organic matter content. The subsoil has a high shrink-swell potential. The root zone extends to a depth of more than 60 inches. The soil is strongly acid to neutral. The hazard of erosion is moderate.

This soil has fair potential for farming, and much of the acreage is farmed. It has poor potential for many urban uses and good potential for grasses and trees.

This soil is moderately well suited to cultivated crops and to pasture and hay. Rock outcrops interfere somewhat with tillage. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer is suitable for this soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

The soil is well suited to trees, but only a small acreage is wooded. The soil is managed mostly for pines and hardwoods. The use of logging equipment is limited by the clayey subsoil, which becomes soft and sticky when wet.

The soil is limited for many urban purposes by moderately slow permeability and a high shrink-swell potential. Capability subclass IIIe.

37C2—Endcav-Rock outcrop complex, 2 to 15 percent slopes, eroded. This unit consists of gently sloping to sloping, well drained soils and outcrops of limestone that are so intermingled that it was not practical to map them separately. The soils are on side slopes of hills and ridges. Slopes are commonly complex and 100 to 300 feet long. The areas of Rock outcrop are 30 to 100 feet apart. Sinkholes are common. Areas of this unit are rectangular and range from 3 to 50 acres. The unit is about 45 percent Endcav soils, 40 percent Rock outcrop, and 15 percent included soils.

Typically, the surface layer of the Endcav soils is brown silt loam about 6 inches thick. The subsoil is yellowish brown silty clay loam and silty clay to a depth of 18 inches and is mottled, yellowish brown clay to a depth of 60 inches or more.

Included with this unit in mapping are small, intermingled areas of Chilhowie, Edom, and Frederick soils. Also included are small wet spots and small spots of severely eroded soils.

Permeability of the Endcav soils is moderately slow, and available water capacity is medium. Runoff is medium to rapid. The soils are medium in natural fertility and low in organic matter content. The subsoil has a high shrink-swell potential. The root zone extends to a depth of more than 60 inches. These soils are strongly acid to neutral. The hazard of erosion is severe.

This unit has poor potential for farming, and much of the acreage is in pasture or woodland. It has poor potential for many urban uses and good potential for grasses and trees.

This unit is not suited to cultivated crops but is moderately well suited to pasture. Rock outcrops interfere with pasture management operations. Controlling erosion, maintaining a mixture of grasses and legumes, and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This unit is well suited to trees, but only a small acreage is wooded. It is managed mostly for pines and hardwoods. The use of logging equipment is limited by Rock outcrop and by the clayey subsoil of the Endcav soils, which becomes soft and sticky when wet.

This unit is limited for many urban purposes by the moderately slow permeability and high shrink-swell potential of the Endcav soils and by Rock outcrop. Capability subclass VIs.

38B—Ernest silt loam, 0 to 7 percent slopes. This deep, nearly level to gently sloping, moderately well drained soil is on toe slopes and along narrow drainageways of intermountain valleys. Slopes are smooth or slightly concave and are about 100 to 500 feet long. Areas of this soil are rectangular or long and winding. They range from 3 to more than 50 acres.

Typically, the surface layer is yellowish brown silt loam about 11 inches thick. The subsoil is 31 inches thick. The upper 15 inches is mottled, brown and strong brown light silty clay loam. The lower 16 inches is a fragipan of mottled, strong brown silt loam. The substratum is mottled, strong brown silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Monongahela, Guernsey, Jefferson, and Craigsville soils that make up about 15 percent of this unit. The Jefferson soils are generally on the steepest part of the landscape, and the Craigsville soils are normally next to drainageways. Also included are a few wet spots and cobbly areas that make up less than 5 percent of the unit.

Permeability is moderately slow in this soil, and available water capacity is medium. Runoff is slow to medium. Tilth is fair, but the soil is low in natural fertility and organic matter content. The subsoil and substratum have moderate shrink-swell potential. The root zone for most annual crops is typically restricted at a depth of 26 inches by the fragipan. The surface layer and subsoil are strongly acid to very strongly acid unless lime has been applied. The water table is at a depth of 1 1/2 to 2 1/2 feet during winter and spring. The hazard of erosion is slight.

This soil has fair potential for farming. Most of the acreage is in pasture or woodland. The soil has poor potential for many urban uses. It has a good potential for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay. Alfalfa is short lived because of seasonal wetness. The need for artificial drainage and diversion channels is a management concern. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soil is cultivated, the use of cover crops and including grasses and legumes in the cropping system help to increase organic matter and maintain tilth. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes, proper grazing, and providing drainage are pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, some of the desirable grasses and legumes die out. Grazing during periods of seasonal wetness cuts up and compacts the surface layer.

The soil is suited to trees, and a moderate acreage is wooded. The soil is managed for pines and hardwoods. The use of timber equipment is limited during periods of wetness.

This soil is limited for many urban purposes by moderately slow permeability and a seasonal high water table during winter and spring. Capability subclass IIw.

38C—Ernest silt loam, 7 to 15 percent slopes. This deep, sloping, moderately well drained soil is on toe slopes and colluvial fans of intermountain valleys. Slopes are slightly concave and are about 200 to 600 feet long. Areas of this soil are rectangular or elongated. They range from 3 to more than 30 acres.

Typically, the surface layer is yellowish brown silt loam about 11 inches thick. The subsoil is 31 inches thick. The upper 15 inches is mottled, brown and strong brown light silty clay loam. The lower 16 inches is a fragipan of mottled, strong brown silt loam. The substratum is mottled, strong brown silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Monongahela, Guernsey, and Jefferson soils that make up about 10 percent of this unit. Also included are a few wet spots and cobbly areas that make up 10 percent of the unit.

Permeability is moderately slow in this soil, and available water capacity is medium. Runoff is medium to rapid. Tilth is fair, but the soil is low in natural fertility and organic matter content. The subsoil and substratum have moderate shrink-swell potential. The root zone for most crops is typically restricted at a depth of 26 inches by the fragipan. The surface layer and the subsoil are strongly acid to very strongly acid unless lime has been applied. The water table is at a depth of 1 1/2 to 2 1/2 feet during winter and spring. The hazard of erosion is severe.

This soil has a fair potential for farming. Most of the acreage is in pasture or woodland. The soil has fair potential for many urban uses. It has a good potential for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay. Alfalfa is short lived because of seasonal wetness. Controlling erosion and providing drainage and diversion channels are management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soil is cultivated, the use of cover crops and including grasses and legumes in the cropping system help to increase organic matter content and maintain tilth. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes, proper grazing, and providing artificial drainage are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and

legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, some of the desirable grasses and legumes die out. Grazing during wet periods cuts up and compacts the surface layer.

This soil is suited to trees, and a moderate acreage is wooded. The soil is managed for pines and hardwoods. The use of logging equipment is limited during periods of wetness.

This soil is limited for many urban purposes by moderately slow permeability and the seasonal high water table during winter and spring. Capability subclass IIIe.

39—Fluvaquents, nearly level. This unit mainly consists of somewhat poorly drained to poorly drained, nearly level to gently sloping, loamy and clayey soils. These soils formed in alluvial material on flood plains. The material is washed from soils underlain by limestone, shale, and sandstone. Some of the soils in this unit are underlain by stratified layers of sand, gravel, and cobblestones. Areas are mostly elongated and range from 2 to more than 75 acres. Some areas have old oxbows and abandoned waterways. Slopes are 0 to 5 percent.

Included with this unit in mapping are small areas of Udifluvents and Massanetta, Chagrin, and Buckton soils. Also included are spots of very poorly drained soils. Included areas make up about 5 percent of the unit.

Permeability is moderately slow in the soils of this unit, and available water capacity is medium. Runoff is slow, and in some areas water is ponded during winter. The areas are subject to flooding, and some receive seepage from adjacent uplands.

Flooding and wetness limit the use of these soils mostly to pasture and water-tolerant hardwoods. The soils have poor potential for most other uses but have good potential for some types of wildlife habitat and as nature areas. Capability subclass not assigned.

40B2—Frederick-Christian silt loams, 2 to 7 percent slopes, eroded. These gently sloping, well drained soils are so intermingled that it was not practical to map them separately. The soils are on convex knolls and ridges. Slopes are smooth and complex and are about 100 to 500 feet long. Many of the larger areas of this unit have shallow drainageways about 100 to 300 feet apart. Areas are long and winding or are rectangular. They range from 3 to 50 acres or more. This unit is about 50 percent Frederick soils, 30 percent Christian soils, and 20 percent included soils.

Typically, the surface layer of the Frederick soils is brown silt loam about 7 inches thick. The subsoil is strong brown silty clay loam to a depth of 14 inches and is yellowish red clay to a depth of more than 60 inches.

Typically, the surface layer of the Christian soils is yellowish brown silt loam about 7 inches thick. The subsoil is yellowish red clay loam and clay about 33 inches thick. The substratum extends to depth of more than 60 inches. It is strong brown and yellowish brown loam and silt loam with pockets of yellowish red clay.

Included with these soils in mapping are small, intermingled areas of Endcav, Bookwood, Edom, and Timberville soils that make up about 10 percent of this unit. Also included are small areas of soils with a fine sandy loam surface layer, small areas of soils with a dark red subsoil, cherty spots, sinkholes, small areas of rock outcrop, and small spots of severely eroded soils. These make up 10 percent of the unit.

Permeability of these soils is moderate, and available water capacity is medium. Runoff is medium. The soils can be easily tilled at optimum moisture content. They are medium in natural fertility and low in organic matter content. The subsoil of both has a moderate shrink-swell potential. The root zone extends to a depth of more than 60 inches. The surface layer of these soils is commonly slightly acid to medium acid, and the subsoil and substratum are strongly acid to very strongly acid. The hazard of erosion is moderate.

This unit has good potential for farming, and much of the acreage is farmed. It has good potential for many urban uses and for grasses and trees.

This unit is suited to cultivated crops and to pasture and hay. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer is suitable on these soils. If the soils are cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This unit is well suited to trees, but only a small acreage is wooded. The soils are managed for hardwoods and pines. The use of logging equipment is limited by the clayey subsoil, which becomes soft and sticky when wet.

This unit is limited for many urban purposes by the clayey subsoil and low strength. Capability subclass IIe.

40C2—Frederick-Christian silt loams, 7 to 15 percent slopes, eroded. These sloping, well drained soils are so intermingled that it was not practical to map them separately. The soils are on convex knolls and ridgetops and on side slopes. Slopes are smooth and complex and are about 200 to 600 feet long. Many of the larger areas of this unit have shallow drainageways about 100 to 300 feet apart. Areas are long and winding or are rectangular, and they range from 3 to 100 acres or more. This unit is about 45 percent Frederick soils, 35 percent Christian soils, and 20 percent included soils.

Typically, the surface layer of the Frederick soils is brown silt loam about 7 inches thick. The subsoil is strong

brown silty clay loam to a depth of about 14 inches and is yellowish red clay to a depth of more than 60 inches.

Typically, the surface layer of the Christian soils is yellowish brown silt loam about 7 inches thick. The subsoil is yellowish red clay loam and clay about 33 inches thick. The substratum extends to a depth of more than 60 inches. It is strong brown and yellowish brown loam and silt loam with pockets of yellowish red clay.

Included with these soils in mapping are small, intermingled areas of Endcav, Bookwood, Edom, and Timberville soils that make up about 15 percent of this unit. Also included are small areas of soils with a fine sandy loam surface layer, small areas of soils with a dark red subsoil, cherty spots, sinkholes, small areas of rock outcrop, and small spots of severely eroded soils. These make up 5 percent of the unit.

Permeability of both soils is moderate, and available water capacity is medium. Runoff is medium to rapid. The soils can be easily tilled at optimum moisture content. They are medium in natural fertility and low in organic matter content. The subsoil of both soils has a moderate shrink-swell potential. The root zone extends to a depth of more than 60 inches. The surface layer of these soils is commonly slightly acid to medium acid, and the subsoil and substratum are strongly acid to very strongly acid. The hazard of erosion is severe.

This unit has fair potential for farming, and much of the acreage is farmed. It has fair potential for many urban uses and good potential for grasses and trees.

This unit is suited to cultivated crops and to pasture and hay. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer is suitable for these soils. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system are practices that help reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This unit is well suited to trees, but only a small acreage is wooded. The unit is managed for hardwoods and pines. The use of logging equipment is limited by the clayey subsoil, which becomes soft and sticky when wet.

The soils in this unit are limited for many urban purposes by the clayey subsoil, low strength, and slope. Capability subclass IIIe.

40D2—Frederick-Christian silt loams, 15 to 25 percent slopes, eroded. These moderately steep, well drained soils are so intermingled that it was not practical to map them separately. The soils are on side slopes of hills and ridges. Slopes are smooth and complex and are about 100 to 500 feet long. Many of the larger areas of this unit have shallow drainageways about 100 to 300 feet apart. Areas are long and winding or are rectangular, and they range from 2 to 100 acres or more. This unit is about 40 percent Frederick soils, 40 percent Christian soils, and 20 percent included soils.

Typically, the surface layer of the Frederick soils is brown silt loam about 5 inches thick. The subsoil is strong brown silty clay loam to a depth of about 14 inches and is yellowish red clay to a depth of more than 60 inches.

Typically, the surface layer of the Christian soils is yellowish brown silt loam about 7 inches thick. The subsoil is yellowish red clay loam and clay about 33 inches thick. The substratum extends to a depth of more than 60 inches. It is strong brown and yellowish brown loam and silt loam with pockets of yellowish red clay.

Included with these soils in mapping are small, intermingled areas of Bookwood, Edom, and Timberville soils that make up about 15 percent of this unit. Also included are small areas of soils with a fine sandy loam surface layer, small areas of soils with a dark red subsoil, cherty spots, sinkholes, small areas of rock outcrop, and small spots of severely eroded soils. These make up about 5 percent of the unit.

Permeability is moderate in these soils, and available water capacity is medium. Runoff is rapid. The soils are medium in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of more than 60 inches. The surface layer of these soils is commonly slightly acid to medium acid, and the subsoil and substratum are strongly acid to very strongly acid. The hazard of erosion is severe.

This unit has poor to fair potential for farming, and much of the acreage is farmed. The soils have poor potential for many urban uses and good potential for grasses and trees.

This unit is poorly suited to cultivated crops and is moderately well suited to pasture and hay. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer helps to offset acidity and improve fertility. If the soils are cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This unit is well suited to trees, but only a small acreage is wooded. The soils are managed for hardwoods and pines. The use of logging equipment is limited by the clayey subsoil, which becomes soft and sticky when wet, and by slope.

This unit is limited for many urban purposes by slope. Capability subclass IVe.

40E2—Frederick-Christian silt loams, 25 to 45 percent slopes, eroded. These steep, well drained soils are so intermingled that it was not practical to map them separately. The soils are on side slopes of hills and ridges. Slopes are smooth and complex and are about 100 to 300 feet long. Many of the larger areas of this unit have shallow drainageways about 50 to 200 feet apart. Areas are long and winding or are rectangular, and they range from 2 to 50 acres or more. This unit is about 45 percent Frederick soils, 45 percent Christian soils, and 10 percent included soils.

Typically, the surface layer of the Frederick soils is brown silt loam about 4 inches thick. The subsoil is strong brown silty clay loam to a depth of about 9 inches and is yellowish red clay to a depth of more than 60 inches.

Typically, the surface layer of the Christian soils is yellowish brown silt loam about 5 inches thick. The subsoil is yellowish red clay loam and clay about 30 inches thick. The substratum extends to a depth of more than 60 inches. It is strong brown and yellowish brown loam and silt loam with pockets of yellowish red clay.

Included with these soils in mapping are small areas of soils with a fine sandy loam surface layer, small areas of soils with a dark red subsoil, cherty spots, sinkholes, small areas of rock outcrop, and small spots of severely eroded soils.

Permeability of these soils is moderate, and available water capacity is medium. Runoff is very rapid. The soils are medium in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of more than 60 inches. The surface layer of these soils is commonly slightly acid to medium acid, and the subsoil and substratum are strongly acid to very strongly acid. The hazard of erosion is severe.

This unit has poor potential for farming, and much of the acreage is in pasture or woods. The soils have poor potential for many urban uses, fair potential for grasses, and good potential for trees.

This unit is not suited to cultivated crops and is poorly suited to pasture. The hazard of erosion is a major limitation. Maintaining a mixture of grasses and legumes and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

These soils are moderately well suited to trees, and a moderate acreage is wooded. The soils are managed for hardwoods and pines. The use of logging equipment is limited by slope.

This unit is limited for many urban purposes by slope. Capability subclass VIe.

41B3—Frederick-Christian silty clay loams, 2 to 7 percent slopes, severely eroded. These gently sloping, well drained soils are so intermingled that it was not practical to map them separately. The soils are on convex knolls and ridges. Slopes are smooth and complex and are about 100 to 300 feet long. Many of the larger areas of this unit have shallow drainageways about 100 to 200 feet apart. Areas are rectangular and range from 3 to 30 acres or more. This unit is about 50 percent Frederick soils, 35 percent Christian soils, and 15 percent included soils.

Typically, the surface layer of the Frederick soils is yellowish red silty clay loam about 6 inches thick. The subsoil is yellowish red clay to depth of more than 60 inches.

Typically, the surface layer of the Christian soils is strong brown silty clay loam about 5 inches thick. The subsoil is yellowish red clay loam and clay about 30 inches thick. The substratum extends to a depth of more than 60 inches. It is strong brown and yellowish brown loam and silt loam with pockets of yellowish red clay.

Included with these soils in mapping are small, intermingled areas of Endcav, Edom, and Timberville soils that make up about 10 percent of this unit. Also included are small areas of sinkholes and small areas of rock outcrop that make up about 5 percent of the unit.

Permeability of these soils is moderate, and available water capacity is medium. Runoff is rapid. Tilth is fair at optimum moisture content. The soils are low in natural fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of more than 60 inches. The surface layer of these soils is commonly slightly acid to medium acid, and the subsoil and substratum are strongly to very strongly acid.

This unit has fair potential for farming, and much of the acreage is farmed. It has fair potential for many urban purposes and good potential for grasses and trees.

This unit is suited to cultivated crops and to pasture and hay. Most of the original surface layer of these soils has been removed by erosion. The exposed subsoil is hard and breaks up in clods when the soils are dry and sticks to plowshares when the soils are wet, thus making seedbed preparation difficult. Increasing organic matter content is a management concern. The use of lime and fertilizer is suitable for these soils. If the soils are cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If

pastures are overgrazed, runoff and the hazard of erosion increase.

This unit is well suited to trees, but only a small acreage is wooded. The unit is managed for hardwoods and pines. The use of logging equipment is limited by the clayey subsoil, which becomes soft and sticky when wet.

This unit is limited for many urban purposes by the clayey subsoil and low strength. Capability ubclass IIIe.

41C3—Frederick-Christian silty clay loams, 7 to 15 percent slopes, severely eroded. These sloping, well drained soils are so intermingled that it was not practical to map them separately. The soils are on convex knolls and ridges. Slopes are smooth and complex and are about 100 to 500 feet long. Many of the larger areas of this unit have shallow drainageways about 100 to 300 feet apart. Areas are rectangular. They range from 3 to 30 acres or more. This complex is about 45 percent Frederick soils, 35 percent Christian soils, and 20 percent included soils.

Typically, the surface layer of the Frederick soils is yellowish red silty clay loam about 6 inches thick. The subsoil is yellowish red clay to a depth of more than 60 inches.

Typically, the surface layer of the Christian soils is strong brown silty clay loam about 5 inches thick. The subsoil is yellowish red clay loam and clay about 30 inches thick. The substratum extends to a depth of more than 60 inches. It is strong brown and yellowish brown loam and silt loam with pockets of yellowish red clay.

Included with these soils in mapping are small, intermingled areas of Endcav, Edom, and Timberville soils that make up about 15 percent of this unit. Also included are small areas of sinkholes and small areas of rock outcrop. These make up about 5 percent of this unit.

Permeability of these soils is moderate. Available water capacity is medium. Runoff is rapid to very rapid. Tilth is fair at optimum moisture content. The soils are low in natural fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of more than 60 inches. The surface layer of these soils is commonly slightly acid to medium acid, and the subsoil and substratum are strongly acid to very strongly acid.

This unit has poor to fair potential for farming. Much of the acreage is farmed. The soils have fair potential for many urban uses and good potential for grasses and trees.

This unit is poorly suited to cultivated crops and is moderately well suited to pasture and hay. Most of the original surface layer of these soils has been removed by erosion. The exposed subsoil is hard and breaks up in clods when the soils are dry and sticks to plowshares when the soils are wet, thus making seedbed preparation difficult. Increasing organic matter content is a management concern. The use of lime and fertilizer is suitable for these soils. If the soils are cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This unit is well suited to trees, but only a small acreage is wooded. The unit is managed for hardwoods and pines. The use of logging equipment is limited by the clayey subsoil, which becomes soft and sticky when wet.

This unit is limited for many urban purposes by the clayey subsoil, slope, and low strength. Capability subclass IVe.

41D3—Frederick-Christian silty clay loams, 15 to 25 percent slopes, severely eroded. These moderately steep, well drained soils are so intermingled that it was not practical to map them separately. The soils are on side slopes of hills and ridges. Slopes are smooth and complex and are about 50 to 300 feet long. Many of the larger areas of this unit have shallow drainageways about 50 to 200 feet apart. Areas are rectangular. They range from 1 to 20 acres. This unit is about 50 percent Frederick soils, 40 percent Christian soils, and 10 percent included soils.

Typically, the surface layer of the Frederick soils is yellowish red silty clay loam about 6 inches thick. The subsoil is yellowish red clay to a depth of more than 60 inches.

Typically the surface layer of the Christian soils is strong brown silty clay loam about 5 inches thick. The subsoil is yellowish red clay loam and clay about 30 inches thick. The substratum extends to a depth of more than 60 inches. It is strong brown and yellowish brown loam and silt loam with pockets of yellowish red clay.

Included with these soils in mapping are small, intermingled areas of Edom soils that make up about 7 percent of this unit and that have a surface layer of strong brown and yellowish red silty clay or silty clay loam. Also included are small areas of rock outcrop and sinkholes that make up about 3 percent of the unit.

Permeability of these soils is moderate, and available water capacity is medium. Runoff is very rapid. The soils are low in natural fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of more than 60 inches. The surface layer of these soils is commonly slightly acid to medium acid, and the subsoil and substratum are strongly acid to very strongly acid.

This unit has poor to fair potential for farming. Much of the acreage is farmed. The soils have poor potential for many urban uses and good potential for grasses and trees.

This unit is not suited to cultivated crops and is moderately well suited to pasture and hay. Most of the original surface layer of these soils has been removed by erosion. The exposed subsoil is hard and breaks up into clods when the soils are dry and sticks to plowshares when the soils are wet, thus making seedbed preparation difficult. Increasing organic matter content, establishing and maintaining a mixture of grasses and legumes, and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This unit is well suited to trees, but only a small acreage is wooded. The soils are managed for hardwoods and pines. The use of logging equipment is limited by the clayey subsoil, which becomes soft and sticky when wet.

This complex is limited for many urban purposes by slope. Capability subclass VIe.

42B2—Frederick-Christian cherty silt loams, 2 to 7 percent slopes, eroded. These gently sloping, well drained soils are so intermingled that it was not practical to map them separately. The soils are on weakly convex knolls and ridgetops. Slopes are smooth and complex and are about 100 to 500 feet long. Many of the larger areas of this unit have shallow drainageways about 100 to 300 feet apart. Areas are long and winding or are rectangular. They range from 3 to 30 acres or more. This unit is about 50 percent Frederick soils, 35 percent Christian soils, and 15 percent included soils.

Typically, the surface layer of the Frederick soils is brown cherty silt loam about 7 inches thick. The subsoil is yellowish red clay to a depth of more than 60 inches.

Typically, the surface layer of the Christian soils is yellowish brown cherty silt loam about 7 inches thick. The subsoil is yellowish red clay loam and clay about 33 inches thick. The substratum extends to a depth of more than 60 inches. It is strong brown and yellowish brown loam and silt loam with pockets of yellowish red clay.

Included with these soils in mapping are small, intermingled areas of Endcav, Bookwood, Edom, and Timberville soils that make up about 10 percent of this unit. Also included are small areas of soils with a silt loam surface layer, very cherty spots, sinkholes, small areas of rock outcrop, and small spots of severely eroded soils. These make up about 5 percent of the unit.

Permeability of these soils is moderate, and available water capacity is medium. Runoff is medium. Tilth is fair, but chert interferes with tillage. The soils are medium in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of more than 60 inches. The surface layer of these soils is commonly slightly acid to medium acid, and the subsoil and substratum are strongly acid to very strongly acid. The hazard of erosion is moderate.

This unit has good potential for farming, and much of the acreage is farmed. It has good potential for many urban uses, fair potential for grasses, and good potential for trees.

This unit is suited to cultivated crops and to pasture and hay, but chert fragments damage tillage equipment and interfere with planting. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer is suitable for these soils. If the soils are cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This unit is well suited to trees, but only a small acreage is wooded. The soils are managed for hardwoods and pines.

This unit is limited for many urban uses by the clayey subsoil and low strength. Capability subclass IIe.

42C2—Frederick-Christian cherty silt loams, 7 to 15 percent slopes, eroded. These sloping, well drained soils are so intermingled that it was not practical to map them separately. The soils are on convex knolls, ridgetops, and side slopes. Slopes are smooth and complex and are about 100 to 500 feet long. Many of the larger areas of this unit have shallow drainageways about 100 to 300 feet apart. Areas are long and winding and are rectangular. They range from 3 to 100 acres or more. This unit is about 45 percent Frederick soils, 35 percent Christian soils, and 20 percent included soils.

Typically, the surface layer of the Frederick soils is brown cherty silt loam about 7 inches thick. The subsoil is strong brown silty clay loam to a depth of about 14 inches and is yellowish red clay between depths of 14 and more than 60 inches.

Typically, the surface layer of the Christian soil is yellowish brown cherty silt loam about 7 inches thick. The subsoil is yellowish red clay loam and clay about 33 inches thick. The substratum extends to a depth of more than 60 inches. It is strong brown and yellowish brown loam and silt loam with pockets of yellowish red clay.

Included with these soils in mapping are small, intermingled areas of Endcav, Bookwood, and Timberville soils that make up about 15 percent of this unit. Also included are small areas of soils with a silt loam surface layer, very cherty spots, sinkholes, small areas of rock outcrop, and small spots of severely eroded soils. These make up about 5 percent of the unit.

Permeability of these soils is moderate, and available water capacity is medium. Runoff is medium to rapid. The

soils are medium in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of more than 60 inches. The surface layer of these soils is commonly slightly acid to medium acid, and the subsoil and substratum are strongly acid to very strongly acid. The hazard of erosion is severe.

This unit has fair potential for farming, and much of the acreage is farmed. It has fair potential for many urban uses, fair potential for grasses, and good potential for trees.

This unit is suited to cultivated crops and to pasture and hay. Tilth is fair, but chert fragments damage tillage equipment and interfere with planting. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer is suitable for these soils. If the soils are cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This unit is well suited to trees, but only a small acreage is wooded. The unit is managed for hardwoods and pines.

This unit is limited for many urban purposes by the clayey subsoil, low strength, and slope. Capability subclass IIIe.

42D2—Frederick-Christian cherty silt loams, 15 to 25 percent slopes, eroded. These moderately steep, well drained soils are so intermingled that it was not practical to map them separately. The soils are on side slopes of hills and ridges. Slopes are smooth and complex and are about 100 to 600 feet long. Many of the larger areas of this unit have shallow drainageways about 100 to 300 feet apart. Areas are long and winding or are rectangular. They range from 3 to 100 acres or more. This unit is about 45 percent Frederick soil, 40 percent Christian soils, and 15 percent included soils.

Typically, the surface layer of the Frederick soils is brown cherty silt loam about 6 inches thick. The subsoil is strong brown silty clay loam to a depth of about 14 inches and is yellowish red clay to a depth of more than 60 inches.

Typically, the surface layer of the Christian soils is yellowish brown cherty silt loam about 6 inches thick. The subsoil is yellowish red clay loam and clay about 33 inches thick. The substratum extends to a depth of more than 60 inches. It is strong brown and yellowish brown loam and silt loam with pockets of yellowish red clay.

Included with these soils in mapping are small, intermingled areas of Bookwood, Edom, and Timberville soils that make up about 10 percent of this unit. Also included are small areas of soils with a silt loam surface layer, very cherty spots, sinkholes, small areas of rock outcrop, and small spots of severely eroded soils. These make up about 5 percent of the unit.

Permeability of these soils is moderate, and available water capacity is medium. Runoff is rapid. The soils are medium in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of more than 50 inches. The surface layer of these soils is commonly slightly acid to medium acid, and the subsoil and substratum are strongly acid to very strongly acid. The hazard of erosion is severe.

This unit has poor to fair potential for farming. Much of the acreage is farmed. The soils have poor potential for many urban uses, fair potential for grasses, and good potential for trees.

This unit is poorly suited to cultivated crops and is moderately well suited to pasture and hay. Chert fragments damage tillage implements and interfere with seeding operations. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer is suitable for these soils. If the soils are cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This unit is well suited to trees, but only a small acreage is wooded. The soils are managed for hardwoods and pines. The use of harvest equipment is limited by the clayey subsoil, which becomes soft and sticky when wet, and by slope.

The soils in this complex are limited for many urban purposes by slope. Capability subclass IVe.

42E2—Frederick-Christian cherty silt loams, 25 to 45 percent slopes, eroded. These steep, well drained soils are so intermingled that it was not practical to map them separately. The soils are on side slopes of hills and ridges. Slopes are smooth and complex and are about 100 to 300 feet long. Many of the larger areas of this unit have shallow drainageways about 50 to 200 feet apart. Areas are long and winding or are rectangular. They range from 3 to 50 acres or more. This unit is about 50 percent Frederick soils, 40 percent Christian soils, and 10 percent included soils.

Typically, the surface layer of the Frederick soils is brown cherty silt loam about 5 inches thick. The subsoil is strong brown silty clay loam to a depth of about 12 inches

and is yellowish red clay to a depth of more than 60 inches.

Typically, the surface layer of the Christian soils is yellowish brown cherty silt loam about 5 inches thick. The subsoil is yellowish red clay loam and clay about 33 inches thick. The substratum extends to a depth of more than 60 inches. It is strong brown and yellowish brown loam and silt loam with pockets of yellowish red clay.

Included with these soils in mapping are small areas of soils with a fine sandy loam surface layer, very cherty spots, sinkholes, small areas of rock outcrop, and small spots of severely eroded soils.

Permeability of these soils is moderate, and available water capacity is medium. Runoff is very rapid. The soils are medium in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of more than 50 inches. The surface layer of these soils is commonly slightly acid to medium acid, and the subsoil and substratum are strongly acid to very strongly acid. The hazard of erosion is severe.

This unit has poor to fair potential for farming, and much of the acreage is in pasture or woodland. It has poor potential for most urban uses, fair potential for grasses, and good potential for trees.

These soils are not suited to cultivated crops and are suited to pasture. Steep slopes limit the use of farm equipment. Controlling erosion, maintaining a mixture of grasses and legumes, and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This complex is well suited to trees, and a moderate acreage is wooded. The unit is managed for hardwoods and pines. The use of logging equipment is limited by slope.

This complex is limited for most urban purposes by slope. Capability subclass VIe.

43C—Frederick-Christian very cherty silt loams, 7 to 15 percent slopes. These sloping, well drained soils are so intermingled that it was not practical to map them separately. The soils are on convex knolls and ridges. Slopes are smooth and complex and are about 100 to 300 feet long. Many of the larger areas of this unit have shallow drainageways about 50 to 200 feet apart. Areas are long and winding or are rectangular. They range from 3 to 50 acres or more. This unit is about 40 percent Frederick soils, 40 percent Christian soils, and 20 percent included soils.

Typically, the surface layer of the Frederick soils is brown very cherty silt loam about 7 inches thick. The subsoil is silty clay loam to a depth of about 14 inches and is yellowish red clay to a depth of more than 60 inches.

Typically, the surface layer of the Christian soils is yellowish brown very cherty silt loam about 7 inches thick. The subsoil is yellowish red clay loam and clay about 33 inches thick. The substratum extends to a depth of more than 60 inches. It is strong brown and yellowish brown loam and silt loam with pockets of yellowish red clay.

Included with these soils in mapping are small, intermingled areas of Nixa and Timberville soils that make up about 15 percent of this unit. Also included are small areas of soils with a cherty silt loam surface layer, small spots of chert boulders, sinkholes, and small areas of rock outcrop. These make up about 5 percent of the unit.

Permeability of these soils is moderate, and available water capacity is medium. Runoff is medium. The soils are medium in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of more than 60 inches. The surface layer of these soils is very cherty and commonly slightly acid to medium acid. The subsoil and substratum are strongly acid to very strongly acid. The hazard of erosion is moderate.

This unit has poor potential for farming, and most of the acreage is in woodland. It has a fair potential for urban purposes, fair potential for grasses, and good potential for trees.

This unit is poorly suited to cultivated crops and to pasture and hay crops. Chert fragments on and in the surface layer make tillage and seeding operations difficult. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer is suitable for these soils. If the soils are cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This unit is suited to trees, and a large acreage is wooded. The unit is managed for hardwoods and pines.

This unit is limited for many urban purposes by the clayey subsoil, slope, and coarse fragments. Capability subclass IVs.

43D—Frederick-Christian very cherty silt loams, 15 to 25 percent slopes. These moderately steep, well drained soils are so intermingled that it was not practical to map them separately. The soils are on short side slopes of knolls and ridges. Slopes are smooth and complex and are about 50 to 200 feet long. Many of the larger areas of this unit have shallow drainageways about 50 to

100 feet apart. Areas are rectangular. They range from 3 to 50 acres. This unit is about 45 percent Frederick soils, 35 percent Christian soils, and 20 percent included soils.

Typically, the surface layer of the Frederick soils is brown very cherty silt loam about 7 inches thick. The subsoil is strong brown silty clay loam to a depth of about 14 inches and is yellowish red clay to a depth of more than 60 inches.

Typically, the surface layer of the Christian soils is yellowish brown very cherty silt loam about 7 inches thick. The subsoil is yellowish red clay loam and clay about 33 inches thick. The substratum extends to a depth of more than 60 inches. It is strong brown and yellowish brown loam and silt loam with pockets of yellowish red clay.

Included with these soils in mapping are small, intermingled areas of Nixa and Timberville soils that make up about 15 percent of this unit. Also included are small areas of soils with a cherty silt loam surface layer, small spots of chert boulders, sinkholes, and small areas of rock outcrop. These make up about 5 percent of the unit.

Permeability of the soils is moderate, and available water capaicty is medium. Runoff is rapid. The soils are medium in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of more than 60 inches. The surface layer of these soils is commonly slightly acid to medium acid, and the subsoil and substratum are strongly acid to very strongly acid. The hazard of erosion is moderate.

This unit has poor potential for farming, and most of the acreage is in woodland. The soils have poor potential for urban uses, fair potential for grasses, and good potential for trees.

This unit is not suited to cultivated crops and is poorly suited to pasture. The very cherty surface layer hinders seeding and farm operations. Controlling erosion, maintaining a mixture of grasses and legumes, and proper grazing are major pasture management concerns. Proper stocking helps in maintaining desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This unit is suited to trees, and a large acreage is wooded. The unit is managed for hardwoods and pines. The use of harvesting equipment is limited by slope.

This unit is limited for most urban purposes by slope. Capability subclass VIs.

43E—Frederick-Christian very cherty silt loams, 25 to 45 percent slopes. These steep, well drained soils are so intermingled that it was not practical to map them separately. The soils are on short side slopes of knolls and ridges. Slopes are smooth and complex and are about 50 to 200 feet long. Many of the larger areas of this unit have shallow drainageways about 25 to 100 feet apart. Areas are rectangular and range from 3 to 60 acres or more. This unit is about 45 percent Frederick soils, 45 percent Christian soils, and 10 percent included soils.

Typically, the surface layer of the Frederick soil is brown very cherty silt loam about 6 inches thick. The subsoil is strong brown silty clay loam to a depth of about 14 inches and is yellowish red clay to a depth of more than 60 inches.

Typically, the surface layer of the Christian soils is yellowish brown very cherty silt loam about 5 inches thick. The subsoil is yellowish red clay loam and clay about 30 inches thick. The substratum extends to a depth of more than 60 inches. It is strong brown and yellowish brown loam and silt loam with pockets of yellowish red clay.

Included with these soils in mapping are small areas of soils with a cherty silt loam surface layer, sinkholes, and small areas of rock outcrop and chert boulders.

Permeability of these soils is moderate, and available water capacity is medium. Runoff is very rapid. The soils are medium in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of more than 50 inches. The surface layer of these soils is commonly slightly acid to medium acid, and the subsoil and substratum are strongly acid to very strongly acid. The hazard of erosion is severe.

This unit has poor potential for farming, and most of the acreage is in woodland. The soils have very poor potential for urban uses, fair potential for grasses, and good potential for trees.

This unit is not suited to cultivated crops and is poorly suited to pasture. Steep slopes and the hazard of erosion are the main limitations. Maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

These soils are suited to trees, and a large acreage is wooded. The soils are managed for hardwoods and pines. The use of logging equipment is limited by slope.

This unit is limited for urban purposes by slope. Capability subclass VIIs.

44B2—Frederick-Christian silt loams, rocky, 2 to 7 percent slopes, eroded. These gently sloping, well drained soils are so intermingled that it was not practical to map them separately. These soils are on convex ridgetops, knolls, and mild side slopes. Slopes are smooth, commonly complex, and 100 to 600 feet long. Most areas of these soils have shallow drainageways 100 to 300 feet apart and rock outcrops about 100 to 300 feet apart. Areas of these soils commonly are long and winding. They range from 2 to 100 acres or more. This unit is about 50 percent Frederick soils, 35 percent Christian soils, and 15 percent included soils.

Typically, the surface layer of the Frederick soils is brown silt loam about 7 inches thick. The subsoil is strong brown silty clay loam to a depth of 14 inches and is yellowish red clay to a depth of more than 60 inches.

Typically, the surface layer of the Christian soils is yellowish brown fine sandy loam about 7 inches thick. The subsoil is yellowish red clay loam and clay 33 inches thick. The substratum extends to a depth of more than 60 inches. It is strong brown and yellowish brown loam and silt loam with pockets of yellowish red clay.

Included with these soils in mapping are small, intermingled areas of Endcav, Bookwood, Edom, and Timberville soils that make up about 10 percent of this unit. Also included are small areas of soils with a fine sandy loam surface layer, small areas of soils with a dark red subsoil, very rocky soils, and small spots of severely eroded soils. These make up about 5 percent of the unit.

These soils have moderate permeability and medium available water capacity. Runoff is medium. The soils are medium in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of more than 60 inches. The surface layer of these soils is commonly slightly acid to medium acid, and the subsoil and substratum are strongly acid to very strongly acid. The hazard of erosion is moderate.

These soils have fair potential for farming, and much of the acreage is farmed. They have good potential for many urban uses and for grasses and trees.

This unit is suited to cultivated crops and to pasture and hay. Rock outcrops interfere somewhat with tillage operations. The soils can be easily tilled at optimum moisture content. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer is suitable for these soils. If the soils are cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This unit is well suited to trees, but only a small acreage is wooded. The unit is managed for hardwoods and pines. The use of logging equipment is limited by slope and by the clayey subsoil, which becomes soft and sticky when wet.

This unit is limited for many urban purposes by the clayey subsoil and rock outcrops. Capability subclass IIe.

44C2—Frederick-Christian silt loams, rocky, 7 to 15 percent slopes, eroded. These sloping, well drained soils are so intermingled that it was not practical to map them separately. The soils are on convex ridgetops, knolls, and side slopes. Slopes are smooth, commonly complex, and 100 to 400 feet long. Most areas of these soils have shallow drainageways from 100 to 300 feet apart and rock outcrops about 100 to 300 feet apart. Areas of these soils commonly are long and winding. They range from 2 to 100 acres or more. This unit is about 45 percent Frederick soils, 40 percent Christian soils, and 15 percent included soils.

Typically, the surface layer of the Frederick soils is brown silt loam about 7 inches thick. The subsoil is strong brown silty clay loam to a depth of about 14 inches and is yellowish red clay to a depth of more than 60 inches.

Typically, the surface layer of the Christian soils is yellowish brown silt loam about 7 inches thick. The subsoil is yellowish red clay loam and clay about 33 inches thick. The substratum extends to a depth of more than 60 inches. It is strong brown and yellowish brown loam and silt loam with pockets of yellowish red clay.

Included with these soils in mapping are small, intermingled areas of Endcav, Bookwood, Edom, and Timberville soils that make up about 10 percent of this unit. Also included are small areas of soils with a fine sandy loam surface layer, small areas of soils with a dark red subsoil, cherty spots, sinkholes, small areas of very rocky soils, and small spots of severely eroded soils. These make up about 5 percent of the unit.

Permeability of these soils is moderate, and available water capacity is medium. Runoff is medium to rapid. The soils are medium in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of more than 60 inches. The surface layer is commonly slightly acid to medium acid, and the subsoil and substratum are strongly acid to very strongly acid. The hazard of erosion is severe.

This unit has fair potential for farming, and much of the acreage is farmed. It has good potential for many urban uses and for grasses and trees.

This unit is moderately well suited to cultivated crops and to pasture and hay. Rock outcrops interfere somewhat with tillage operations. Tillage is good at the optimum moisture content. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer is suitable for these soils. If the soils are cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This unit is well suited to trees, but only a small acreage is wooded. The soils are managed for hardwoods and pines. The use of logging equipment is limited by the clayey subsoil, which becomes soft and sticky when wet.

This unit is limited for many urban purposes by the clayey subsoil, slope, and rock outcrops. Capability subclass IIIe.

44D2—Frederick-Christian silt loams, rocky, 15 to 25 percent slopes, eroded. These moderately steep, well drained soils are so intermingled that it was not practical to map them separately. These soils are on side slopes of hills and ridges. Slopes are smooth, commonly complex, and 100 to 400 feet long. Most areas of these soils have shallow drainageways from 50 to 200 feet apart and rock outcrops 100 to 300 feet apart. Areas of these soils commonly are long and winding. They range from 2 to 100 acres or more. This unit is about 40 percent Frederick soils, 40 percent Christian soils, and 20 percent included soils.

Typically, the surface layer of the Frederick soils is brown silt loam about 6 inches thick. The subsoil is strong brown silty clay loam to a depth of about 14 inches and is yellowish red clay to a depth of more than 60 inches.

Typically, the surface layer of the Christian soils is yellowish brown silt loam about 6 inches thick. The subsoil is yellowish red clay loam and clay about 32 inches thick. The substratum extends to a depth of more than 60 inches. It is strong brown and yellowish brown loam and silt loam with pockets of yellowish red clay.

Included with these soils in mapping are small, intermingled areas of Bookwood, Edom, and Timberville soils that make up about 15 percent of this unit. Also included are small areas of soils with a fine sandy loam surface layer, small areas of soils with a dark red subsoil, cherty spots, sinkholes, small areas of very rocky soils, and small spots of severely eroded soils. These make up about 5 percent of the unit.

Permeability of these soils is moderate, and available water capacity is medium. Runoff is rapid. The soils are medium in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of more than 50 inches. The surface layer of these soils is commonly slightly acid to medium acid, and the subsoil and substratum are strongly acid to very strongly acid. The hazard of erosion is severe.

These soils have poor to fair potential for crops. Much of the acreage is farmed. The soils have poor potential for most urban uses and good potential for grasses and trees.

This unit is poorly suited to cultivated crops and is moderately well suited to pasture and hay. Rock outcrops interfere somewhat with haying operations. The hazard of erosion and slope are major limitations for farming. Increasing organic matter content is a management concern. The use of lime and fertilizer is suitable for these soils. If the soils are cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and preventing overgrazing are major management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This unit is well suited to trees, but only a small acreage is wooded. The unit is managed for hardwoods and pines. The use of logging equipment is limited by the clayey subsoil, which becomes soft and sticky when wet, and by slope.

This unit is limited for most urban purposes by slope. Capability subclass IVe.

44E2—Frederick-Christian silt loams, rocky, 25 to 45 percent slopes, eroded. These steep, well drained soils are so intermingled that it was not practical to map them separately. The soils are on short side slopes of hills and ridges. Slopes are smooth, commonly complex, and 50 to 300 feet long. Most areas of these soils have shallow drainageways 50 to 200 feet apart and rock outcrops 100 to 300 feet apart. Areas of these soils are rectangular. They range from 2 to 30 acres. This unit is about 45 percent Frederick soils, 45 percent Christian soils, and 10 percent included soils.

Typically, the surface layer of the Frederick soils is brown silt loam about 5 inches thick. The subsoil is strong brown light clay loam to a depth of about 14 inches and is yellowish red clay to a depth of more than 60 inches.

Typically, the surface layer of the Christian soils is yellowish brown silt loam about 5 inches thick. The subsoil is yellowish red clay loam and clay about 30 inches thick. The substratum extends to a depth of more than 60 inches. It is strong brown and yellowish brown loam and silt loam with pockets of yellowish red clay.

Included with these soils in mapping are small areas of very rocky soils, small areas of soils with a dark red subsoil, cherty spots, sinkholes, and small spots of severely eroded soils.

Permeability of these soils is moderate, and available water capacity is medium. Runoff is very rapid. The soils are medium in natural fertility and low in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of more than 60 inches. The surface layer of these soils is commonly slightly acid to medium acid, and the subsoil and substratum are strongly acid to very strongly acid. The hazard of erosion is severe.

This unit has poor potential for farming, and much of the acreage is in pasture or woodland. It has poor potential for many urban uses, fair potential for grasses, and good potential for trees.

This unit is not suited to cultivated crops and is poorly suited to pasture. The hazard of erosion and rock outcrops are major limitations. Maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If the pastures are overgrazed, runoff and the hazard of erosion increase.

This unit is moderately well suited to trees, and a moderate acreage is wooded. The unit is managed for hardwoods and pines. The use of logging equipment is limited by slope.

This unit is limited for many urban purposes by slope. Capability subclass VIe.

45C2—Frederick-Rock outcrop complex, 0 to 15 percent slopes, eroded. This unit consists of nearly level to sloping, well drained Frederick soils and outcrops of limestone that are so intermingled that it was not practical to map them separately. The unit is on side slopes of hills and ridges. Slopes are commonly complex and are 100 to 700 feet long. The areas of Rock outcrop are 10 to 30 feet apart. Sinkholes are common in this unit. Areas of this unit are mainly rectangular. They range from 3 to 200 acres. The unit is about 50 percent Frederick soils, 30 percent Rock outcrop, and 20 percent included soils.

Typically, the surface layer of the Frederick soils is brown silt loam about 7 inches thick. The subsoil is strong brown silty clay loam to a depth of 14 inches and is yellowish red clay to a depth of more than 60 inches.

Included with this unit in mapping are small, intermingled areas of Christian, Endcav, Edom, and Timberville soils that make up about 15 percent of this unit. Also included are small areas of soils that have a dark red subsoil and small spots of severely eroded soils. These make up about 5 percent of the unit.

The Frederick soils are slightly acid to strongly acid unless limed. Fertility and organic matter content are low. The subsoil and substratum of these soils are moderately permeable and have moderate available water capacity. Runoff is medium to rapid.

This unit has poor potential for farming, and most of the acreage is in pasture or woodland. The unit has poor potential for most urban uses, fair potential for grasses, and good potential for trees.

Most areas of this unit are grazed and managed for pasture. A part of the acreage is in hardwoods or cedar.

This unit is limited for urban purposes by the areas of Rock outcrop. Capability subclass VIs.

45E2—Frederick-Rock outcrop complex, 15 to 45 percent slopes, eroded. This unit consists of moderately steep to steep, well drained Frederick soils and outcrops of limestone that are so intermingled that it was not practical to separate them in mapping. The unit is on side slopes of hills and ridges. Slopes are commonly complex and are 100 to 700 feet long. The areas of Rock outcrop are 10 to 30 feet apart. Sinkholes are common in this unit. Areas of this unit are rectangular. They range from 3 to 200 acres. This unit is about 45 percent Frederick soils, 35 percent Rock outcrop, and 20 percent included soils.

Typically, the surface layer of the Frederick soils is brown silt loam about 7 inches thick. The subsoil is strong brown silty clay loam to a depth of 14 inches and is yellowish red clay to a depth of more than 60 inches.

Included with this unit in mapping are small, intermingled areas of Christian, Edom, and Timberville soils that make up about 10 percent of this unit. Also included are small areas of soils that have a dark red subsoil, small spots of severely eroded soils, and gullies. These make up about 10 percent of the unit.

These soils are slightly acid to strongly acid. Fertility and organic matter content are low. The subsoil and substratum are moderately permeable and have moderate available water capacity. Runoff is rapid to very rapid.

This unit has little or no potential for farming, and most of the acreage is in pasture or woodland. The unit has poor potential for urban uses, fair potential for grasses, and good potential for trees.

Most areas of this unit are in hardwoods or cedar. A small acreage is grazed and managed for pasture.

This unit is limited for urban use by the areas of Rock outcrop and slope. Capability subclass VIIs.

46B—Frederick-Nixa complex, 2 to 7 percent slopes. These gently sloping, well drained to moderately well drained soils are so intermingled that it was not practical to map them separately. The soils are at the base of or along the lower slopes of cherty knolls and ridges. Slopes are smooth, slightly complex, and about 150 to 400 feet long. Areas are rectangular or elongated. They range from 2 to 20 acres. This unit is about 50 percent Frederick soils, 40 percent Nixa soils, and 10 percent included soils.

Typically, the surface layer of the Frederick soils is brown very cherty silt loam about 7 inches thick. The subsoil is strong brown silty clay loam to a depth of about 14 inches and is yellowish red clay to a depth of more than 60 inches.

Typically, the surface layer of the Nixa soils is pale brown or very pale brown very cherty silt loam about 15 inches thick. The subsoil extends to a depth of more than 60 inches. It is a dense, compact fragipan of mottled, light yellowish brown very cherty silt loam to a depth of about 34 inches and is mottled, brownish yellow cherty silt loam to a depth of more than 60 inches.

Included with these soils in mapping are small areas of Timberville soils that are in low areas and along drainageways and that makes up about 5 percent of this unit. Also included are small wet areas along drainageways and a few sinkholes. These areas make up about 5 percent of the unit.

Permeability of the Frederick soils is moderate and of the Nixa soils is very slow. Available water capacity of the Frederick soils is medium and of the Nixa soils is very low. Runoff is slow to medium. Tilth is fair, but these soils are

low to medium in natural fertility and low in organic matter content. The subsoil has a low to moderate shrink-swell potential. The root zone extends to a depth of about 60 inches in the Frederick soils and about 16 inches in the Nixa soils. The surface layer of these soils is commonly medium acid to strongly acid, and the subsoil is strongly acid. The hazard of erosion is slight.

This unit has fair potential for farming. Much of the acreage is in pasture or woodland. The soils have poor to fair potential for many urban uses. They have a fair potential for grasses and trees.

This unit is moderately well suited to cultivated crops and to pasture and hay. The Nixa soils of this complex are very droughty during the growing season. Chert fragments in the surface of these soils interfere with tillage operations and seeding. Increasing organic matter content is a management concern. The use of lime and fertilizer is suitable for these soils. If the soils are cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This unit is suited to trees, and a moderate acreage is wooded. The soils are managed for hardwoods and pines.

This unit is limited for many urban purposes by the clayey subsoil of the Frederick soils and the very slow permeability of the Nixa soils. Capability subclass IIIe.

46C—Frederick-Nixa complex, 7 to 15 percent slopes. These sloping, well drained to moderately well drained soils are so intermingled that it was not practical to map them separately. The soils are at the base of or along the lower slopes of cherty knolls and ridges. Slopes are smooth, slightly complex, and about 150 to 300 feet long. Areas are rectangular or elongated. They range from 3 to 15 acres. This unit is about 45 percent Frederick soils, 45 percent Nixa soils, and 10 percent included soils.

Typically, the surface layer of the Frederick soils is brown very cherty silt loam about 7 inches thick. The subsoil is strong brown silty clay loam to a depth of about 14 inches and is yellowish red clay to a depth of more than 60 inches.

Typically, the surface layer of the Nixa soils is pale brown or very pale brown very cherty silt loam about 15 inches thick. The subsoil extends to a depth of more than 60 inches. It is a dense, compact fragipan of mottled, light yellowish brown very cherty silt loam to a depth of 34 inches and is mottled, brownish yellow cherty silt loam to a depth of more than 60 inches.

Included with these soils in mapping are small areas of Timberville soils that are in low areas and along drainageways and that make up about 5 percent of this unit. Also included are small wet areas along the drainageways and a few sinkholes. These areas make up about 5 percent of the unit.

Permeability of the Frederick soils is moderate and of the Nixa soils is very slow. Available water capacity of the Frederick soils is medium and of the Nixa soils is very low. Runoff is low to medium. Tilth is fair, but these soils are low to medium in natural fertility and low in organic matter content. The subsoil has a low to moderate shrink-swell potential. The root zone extends to a depth of about 60 inches in the Frederick soils and 16 inches in the Nixa soils. The surface layer of these soils is commonly medium acid to strongly acid, and the subsoil is strongly acid to very strongly acid. The hazard of erosion is slight.

This unit is poorly suited to cultivated crops. It is better suited to pasture and hay. The Nixa soils are very droughty during the growing season. Chert fragments in the surface of these soils interfere with tillage operations and seeding. Increasing organic matter content is a management concern. The use of lime and fertilizer is suitable for these soils. If the soils are cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This unit is suited to trees, and a moderate acreage is wooded. The soils are managed for hardwoods and pines.

This unit is limited for many urban purposes by the clayey subsoil of the Frederick soils and very slow permeability of the Nixa soils. Capability subclass IVe.

47C—Guernsey silt loam, 2 to 10 percent slopes. This gently sloping to sloping, moderately well drained soil is in slightly concave areas along drainageways and below mountain foot slopes and in slightly concave upland depressions. Slopes are smooth and 100 to 500 feet long. Areas of this soil are long and narrow or oval. They range from 5 to 25 acres.

Typically, the surface layer is dark grayish brown and very pale brown silt loam about 6 inches thick. The subsoil is mainly yellowish brown and light yellowish brown silty clay loam and silty clay 34 inches thick. The substratum is yellowish brown and light yellowish brown weathered shale 20 inches thick. Hard shale is at a depth of 60 inches.

Included with this soil in mapping are small areas of poorly drained soils and shaly and very shaly soils. Included soils make up about 10 to 15 percent of this unit.

Permeability of this soil is moderately slow to slow, and available water capacity is medium. Runoff is medium. Tilth is good, and the soil is high in natural fertility and low in organic matter content. The subsoil is slightly plastic and has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and upper part of the subsoil are strongly acid to neutral, and the lower part of the subsoil is neutral to moderately alkaline. The hazard of erosion is moderate. The soil receives seepage and overflow from adjacent higher lying areas. It has a seasonal high water table during winter and spring.

This soil has fair potential for farming, and much of the acreage is farmed. It has poor potential for most urban uses and good potential for grasses and trees.

This soil is suited to cultivated crops, but providing drainage, controlling seepage and erosion, and increasing organic matter content are major management concerns. The soil is suited to pasture and hay. Alfalfa is short lived because of seasonal wetness. The use of lime and fertilizer is suitable for this soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to increase organic matter and maintain tilth. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, use of lime and fertilizer, artificial drainage, and control of flooding are suitable practices of pasture management. If pastures are overgrazed, some of the desirable grasses and legumes die out. Grazing during periods of seasonal wetness cuts up and compacts the surface layer.

This soil is suited to trees, but only a small acreage is wooded. The soil is managed for pines and hardwoods.

This soil is limited for most urban purposes by a seasonal high water table, low strength, and moderately slow to slow permeability. Capability subclass IIe.

48E—Hartleton channery loam, 15 to 45 percent slopes. This deep, moderately steep to steep, well drained soil is on convex ends of ridgetops and on upper side slopes of the Blue Ridge Mountains. Slopes are smooth or slightly concave, commonly complex, and about 200 to 1,200 feet long. Areas of this soil are rectangular or elongated. They range from 3 to more than 300 acres.

Typically, the surface layer is yellowish brown channery loam about 6 inches thick. The subsoil is yellowish brown channery to very channery heavy loam to light clay loam about 27 inches thick. The substratum is yellowish brown very channery silt loam 17 inches thick. Hard sandstone and shale are at a depth of 50 inches.

Included with this soil in mapping are small, intermingled areas of Cataska, Hazleton, and Lew soils that make up about 15 percent of this unit. Also included are small areas of stony and very stony soils and small areas of rock outcrop that make up about 5 percent of the unit.

Permeability of this soil is moderate, and available water capacity is medium. Runoff is rapid. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 50 inches, but growth is restricted at a depth of about 33 inches by the many coarse fragments in the soil. The surface layer and subsoil are commonly strongly acid or very strongly acid unless lime has been applied. Bedrock is at a depth of 40 to 60 inches. The hazard of erosion is severe.

This soil has poor to fair potential for farming, and most of the acreage is wooded. The soil has very poor potential for most urban uses and fair potential for grasses and trees.

This soil is not suited to cultivated crops and is moderately well suited to pasture. The soil is droughty during the growing season. Maintaining a mixture of grasses and legumes and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer to offset acidity and increase fertility are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is moderately well suited to trees, and a large acreage is wooded. The soil is managed mostly for hardwoods. The use of logging equipment is limited by steep slopes.

This soil is limited for many urban uses by steep slopes and depth to bedrock. Capability subclass IVs.

49F—Hartleton soils, 25 to 75 percent slopes. These deep, steep to very steep, well drained soils are on side slopes of the Blue Ridge Mountains. Slopes are smooth or slightly concave and are 100 to 1,000 feet long. Sandstone stones and boulders cover 3 to 40 percent of the surface. Areas are long and winding. They range from 3 to more than 200 acres.

Typically, the surface layer is yellowish brown channery loam about 6 inches thick. The subsoil is yellowish brown channery loam, channery clay loam, and very channery clay loam about 27 inches thick. The substratum is yellowish brown very channery silt loam 17 inches thick. Hard sandstone and shale are at a depth of 50 inches.

Included with these soils in mapping are small, intermingled areas of Cataska, Hazleton, and Lew soils that make up about 20 percent of this unit. Also included are small areas of rock outcrop that make up less than 3 percent of the unit.

Permeability of these soils is moderate, and available water capacity is medium. Runoff is rapid. The soils are low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone

extends to a depth of about 50 inches, but growth is restricted at a depth of about 33 inches by the many coarse fragments in the soil. The surface layer and subsoil are commonly strongly acid or very strongly acid. Bedrock is at a depth of 40 to 60 inches. The hazard of erosion is severe.

These soils have no potential for farming, and most of the acreage is wooded. They have poor potential for urban use, poor potential for grasses, and fair potential for trees.

These soils are not suited for cultivated crops or to pasture or hay. The soils are droughty during the growing season. The hazard of erosion is a major limitation.

These soils are suited to trees, and most of the acreage is wooded. The use of logging equipment is limited by steep slopes. Logging roads and skid trails should be established on the contour where possible.

These soils are limited for most urban uses by steep slopes and stones on the surface. Capability subclass VIIs.

50D—Hazleton stony fine sandy loam, 7 to 25 percent slopes. This deep, sloping to moderately steep, well drained soil is on ridgetops and benches. Slopes are smooth, commonly complex, and about 100 feet to 1,200 feet long. Stones cover 0.1 to 3 percent of the surface. Areas are commonly long and winding. They range from 2 to more than 100 acres.

Typically, the surface layer is dark yellowish brown and yellowish brown sandy loam about 10 inches thick. The subsoil is yellowish brown channery fine sandy loam and very channery sandy loam about 32 inches thick. The substratum is light yellowish brown very channery sandy loam to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Berks, Drall, Leetonia, and Lehew soils that make up about 10 to 15 percent of this unit. Also included are small areas of rock outcrop and small areas of very stony or extremely stony soils. These make up about 5 percent of the unit.

Permeability is moderately rapid to rapid in this soil, and available water capacity is low. Runoff is medium to rapid. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 40 to 60 inches. The surface layer and the subsoil are commonly strongly acid or very strongly acid. Depth to bedrock is 4 to 6 feet or more. The hazard of erosion is moderate to severe.

This soil has poor to fair potential for farming, and most of the acreage is in woodland. It has fair potential for most urban uses and for grasses and trees.

This soil is poorly suited to cultivated crops and is moderately well suited to pasture and hay. The soil is droughty during the growing season. Controlling erosion, removing stones, and increasing organic matter content are management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is suited to trees, and a large acreage is wooded. The soil is managed mostly for hardwoods. The use of logging equipment is limited on the steeper slopes.

This soil is limited for most urban uses by steep slopes and moderately rapid to rapid permeability. Capability subclass IVe.

50E—Hazleton stony fine sandy loam, 25 to 45 percent slopes. This deep, steep, well drained soil is on side slopes of mountains. Slopes are smooth, commonly complex, and about 200 to 600 feet long. Stones cover 0.1 to 3 percent of the surface. Areas are commonly long and winding. They range from 5 to more than 200 acres.

Typically, the surface layer is dark yellowish brown and yellowish brown sandy loam about 10 inches thick. The subsoil is yellowish brown channery to very channery fine sandy loam and sandy loam about 32 inches thick. The substratum is light yellowish brown very channery sandy loam to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Berks, Drall, Leetonia, and Lehew soils that make up about 20 percent of this unit. Also included are small areas of rock outcrop and small areas of very stony or extremely stony soils that make up about 5 percent of the unit.

Permeability is moderately rapid to rapid in this soil, and available water capacity is low. Runoff is rapid. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 40 to 60 inches. The surface layer and subsoil are commonly strongly acid or very strongly acid. Depth to bedrock is 4 to 6 feet or more. The hazard of erosion is severe.

This soil has poor to fair potential for farming, and most of the acreage is in woodland. The soil has poor potential for most urban uses and fair potential for grasses and trees.

This soil is not suited to cultivated crops and is moderately well suited to pasture. The soil is droughty during the growing season. Controlling erosion, establishing and maintaining a mixture of grasses and legumes, and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is suited to trees, and a large acreage is wooded. The soil is managed mostly for hardwoods. The use of logging equipment is limited by steep slopes.

This soil is limited for most urban uses by steep slopes and moderately rapid to rapid permeability. Capability subclass VIs.

51D—Hazleton soils, 7 to 25 percent slopes. These deep, sloping to moderately steep, well drained soils are on ridgetops. Slopes are smooth, commonly complex, and about 100 to more than 500 feet long. Stones cover 3 to 15 percent of the surface. Areas are commonly long and winding. They range from 5 to more than 100 acres.

Typically, the surface layer is dark yellowish brown to yellowish brown cobbly sandy loam or loam about 10 inches thick. The subsoil is yellowish brown channery to very channery fine sandy loam and sandy loam about 32 inches thick. The substratum is light yellowish brown very channery sandy loam to a depth of more than 60 inches.

Included with these soils in mapping are small, intermingled areas of Drall, Leetonia, and Lehew soils that make up about 15 percent of this unit. Also included are small areas of rock outcrop, small areas of extremely stony soils, and areas of cobbly and very cobbly soils. These make up about 15 percent of the unit.

Permeability is moderately rapid to rapid in these soils, and available water capacity is low. Runoff is medium to rapid. These soils are low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 40 to 60 inches. The surface layer and subsoil of these soils are commonly strongly acid or very strongly acid. Depth to bedrock is 4 to 6 feet or more. The hazard of erosion is moderate to severe.

These soils have poor potential for farming, and most of the acreage is in woodland. The soils have a poor potential for most urban uses, poor potential for grasses, and fair potential for trees.

These soils are not suited to cultivated crops and are poorly suited to pasture. The soils are droughty during the growing season. Controlling erosion, maintaining a mixture of grasses and legumes, and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

These soils are suited to trees, and most of the acreage is wooded. The soils are managed mostly for hardwoods. The use of logging equipment is limited on the steeper slopes.

These soils are limited for most urban uses by steep slopes, stoniness, and moderately rapid to rapid permeability. Capability subclass VIs.

51F—Hazleton soils, 25 to 70 percent slopes. These deep, steep to very steep, well drained soils are on mountain side slopes and mountaintops. Slopes are irregular, commonly complex, and about 300 to more than 3,000 feet long. About 15 to 90 percent of the surface is covered by sandstone and quartzite stones. Very steep intermittent drainageways commonly originate in areas of this unit. Rock outcrops and escarpments are common in some areas. Areas of these soils are generally long and winding. They range from 20 to more than 2,000 acres.

Typically, the surface layer is dark yellowish brown and yellowish brown sandy loam about 10 inches thick. The subsoil is yellowish brown channery and very channery fine sandy loam and sandy loam about 32 inches thick. The substratum is light yellowish brown very channery sandy loam to a depth of more than 60 inches.

Included with these soils in mapping are small, intermingled areas of Drall, Leetonia, and Lehew soils that make up about 10 to 15 percent of this unit. Also included are small areas of rubble and stony or very stony soils. These make up about 5 percent of the unit.

Permeability is moderately rapid to rapid in these soils and available water capacity is low. Runoff is rapid. The soils are low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 40 to 60 inches. The surface layer and subsoil are commonly strongly acid or very strongly acid. Depth to bedrock is 4 to 6 feet or more.

These soils have no potential for farming, and none of the acreage is farmed. They have little or no potential for most urban uses, poor potential for grasses, and fair potential for trees. The soils have good potential for esthetic value, wildlife habitat, and watersheds.

These soils are suited to trees, and most of the acreage is wooded. The soils are managed mostly for hardwoods. The use of logging equipment is limited by steep slopes and stoniness.

These soils are limited for most urban uses by stoniness and slope. Capability subclass VIIs.

52F—Hazleton-Lehew complex, 25 to 70 percent slopes. These deep or moderately deep, steep to very steep, well drained to excessively drained soils are so intermingled that it was not practical to map them separately. The soils are on side slopes of mountains. Slopes are smooth, commonly complex, and about 500 to 2,000 feet long. Stones and boulders cover 15 to 40 percent of the surface. Moderately deep drainageways commonly begin on the upper slopes of this unit and are 100 to 300 feet apart. Areas of this unit are rectangular. They range from 3 to more than 500 acres. This unit is about 40 percent Hazleton soils, 35 percent Lehew soils, and 25 percent included soils.

Typically, the surface layer of the Hazleton soils is dark yellowish brown and yellowish brown sandy loam about 10 inches thick. The subsoil is yellowish brown channery and very channery fine sandy loam and sandy loam about 32 inches thick. The substratum is light yellowish brown very channery sandy loam to a depth of more than 60 inches.

Typically, the surface layer of the Lehew soils is reddish brown flaggy fine sandy loam about 7 inches thick. The subsoil is yellowish red channery and very channery loam and fine sandy loam about 19 inches thick. The substratum is reddish brown very flaggy fine sandy loam 6 inches thick. Sandstone bedrock is at a depth of 32 inches.

Included with these soils in mapping are small, intermingled areas of Berks, Drall, and Leetonia soils that make up about 20 percent of this unit. The Berks soils are shaly, and the Drall and Leetonia soils are sandy. Also included are rock outcrops which make up about 5 percent of the unit.

Permeability is moderately rapid to rapid in the Hazleton soils and moderate to rapid in the Lehew soils. Available water capacity of both soils is low. Runoff is rapid. The soils are low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 40 to 60 inches in the Hazleton soils and to about 26 inches in the Lehew soils. The surface layer and subsoil of these soils are commonly strongly acid or very strongly acid. Depth to bedrock is 4 to 6 feet in the Hazleton soils and 2 to 3 feet in the Lehew soils.

This unit has no potential for farming. Most areas are wooded. The soils have poor potential for most urban uses, poor potential for grasses, and fair potential for trees. They have good potential for watersheds.

This unit is suited to trees, and most of the acreage is wooded. The soils are managed mostly for hardwoods. The use of logging equipment is limited by steep slopes and stoniness.

This unit is limited for most urban uses by slope and stoniness. Capability subclass VIIs.

53C—Jefferson cobbly fine sandy loam, 7 to 15 percent slopes. This sloping, well drained soil is on broad, slightly concave mountain foot slopes and fans. Slopes are smooth and about 200 to 2,000 feet wide. This soil has shallow drainageways 100 to 400 feet apart. Areas of this soil are long and winding or triangular. They range from 5 to more than 150 acres.

Typically, the surface layer is yellowish brown cobbly fine sandy loam about 13 inches thick. The subsoil is about 44 inches thick. It is friable, yellowish brown and strong brown sandy clay loam and clay loam that is mottled in the lower part. The substratum is mottled, strong brown very cobbly clay loam to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Allegheny, Cotaco, and Monongahela soils that make up about 10 to 15 percent of this unit. These soils are generally along lower edges and lower slopes. Also included are small spots of stony soils and soils with a weak fragipan. These make up about 5 percent of the unit.

Permeability of this soil is moderately rapid, and available water capacity is medium. Runoff is medium to rapid. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of more than 60 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid. The hazard of erosion is severe.

This soil has a fair potential for farming. A large acreage is in pasture and woodland. The soil has fair potential for many urban uses. It has good potential for grasses and trees.

This soil is moderately well suited to cultivated crops. It is better suited to pasture and hay. Tilth is fair, but cobblestones and pebbles interfere with tillage and make seeding difficult. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase. Grazing during periods of seasonal wetness cuts up and compacts the surface layer and increases erosion.

This soil is suited to trees, and a large acreage is wooded. The soil is managed for pines and hardwoods.

This soil is limited for many urban purposes by slope and moderately rapid permeability. Capability subclass IIIe.

53D—Jefferson cobbly fine sandy loam, 15 to 25 percent slopes. This moderately steep, well drained soil is on broad, slightly concave mountain foot slopes and on breaks between foot slopes and terraces. Slopes are smooth to irregular and are about 200 to 800 feet long. This soil has shallow drainageways about 100 to 400 feet apart. Areas of this soil are long and winding. They range from 5 to more than 50 acres.

Typically, the surface layer of this soil is yellowish brown cobbly fine sandy loam about 13 inches thick. The subsoil is about 44 inches thick. It is friable, yellowish brown and strong brown sandy clay loam and clay loam that is mottled in the lower part. The substratum is mottled strong brown very cobbly clay loam to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Berks, Hazleton, and Weikert soils that make up about 10 to 15 percent of this unit. They are shallower to bedrock and contain a higher percentage of shale fragments than this Jefferson soil. Also included are small spots of stony soils and soils with a weak fragipan. These make up about 5 percent of the unit.

Permeability of this soil is moderately rapid, and available water capacity is moderate. Runoff is rapid. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone

extends to a depth of more than 60 inches. The surface layer and subsoil are commonly very strongly acid to strongly acid. The hazard of erosion is severe.

This soil has poor to fair potential for farming, and most of the acreage is wooded. It has fair potential for some urban uses and for grasses and trees.

This soil is poorly suited to cultivated crops. It is moderately well suited to pasture and hay. Tilth is fair, but cobblestones and pebbles interfere with tillage and seeding operations. The use of lime and fertilizer helps to offset acidity and increase fertility. Controlling erosion, increasing organic matter content, establishing and maintaining a mixture of grasses and legumes, and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures and deferment of grazing are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is suited to trees, and a moderate acreage is wooded. The soil is managed for pines and hardwoods. The use of logging equipment is limited by slope.

This soil is limited for most urban purposes by slope. Capability subclass IVe.

54C—Leetonia very stony loamy sand, 7 to 15 percent slopes. This deep, sloping, well drained to excessively drained soil is on broad mountaintops. Slopes are smooth and are about 200 to 600 feet wide. Sandstone and quartzite stones cover about 3 to 15 percent of the surface. Areas of this soil are long and winding. They range from 5 to more than 100 acres.

Typically, the surface layer is dark gray gravelly loamy sand about 3 inches thick. The subsurface layer is light gray gravelly loamy sand 4 inches thick. The subsoil is dark brown and brownish yellow gravelly loamy sand and very gravelly sand about 13 inches thick. The substratum is olive yellow very gravelly sand 25 inches thick. Hard, grayish quartzite rock is at a depth of 45 inches.

Included with this soil in mapping are small, intermingled areas of Hazleton and Lehew soils that make up about 10 percent of this unit. Also included are small areas of boulders that make up about 2 percent of the unit.

Permeability is moderately rapid in this soil, and available water capacity is low. Runoff is medium to rapid. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 45 inches. The surface layer and subsoil are commonly very strongly acid unless lime has been applied. Bedrock is at a depth of 40 to 48 inches.

This soil has no potential for farming, and none of the acreage is farmed. It has poor potential for most urban uses and for grasses and trees.

This soil is poorly suited to trees, but most of the acreage is in low-quality woodland.

This soil is suited to wildlife habitat and to watersheds. Capability subclass VIs.

54E—Leetonia extremely stony loamy sand, 15 to 45 percent slopes. This deep, moderately steep to steep, well drained to excessively drained soil is on the upper side slopes of mountains. Slopes are smooth or slightly concave and are about 300 to 800 feet long. Sandstone and quartzite stones cover about 15 to 40 percent of the surface. Areas of this soil are relatively long and winding. They range from 5 to more than 100 acres.

Typically, the surface layer is dark gray gravelly loamy sand about 3 inches thick. The subsurface layer is light gray gravelly loamy sand 4 inches thick. The subsoil is dark brown and brownish yellow gravelly loamy sand and very gravelly sand about 13 inches thick. The substratum is olive yellow very gravelly sand 25 inches thick. Hard, grayish quartzite rock is at a depth of 45 inches.

Included with this soil in mapping are small, intermingled areas of Hazleton and Lehew soils that make up about 10 percent of this unit. Also included are small areas of boulders that make up about 2 percent of the unit.

Permeability is moderately rapid in this soil, and available water capacity is low. Runoff is rapid. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 45 inches. The surface layer and subsoil are commonly very strongly acid. Bedrock is at a depth of 40 to 48 inches.

This soil has no potential for farming, and none of the acreage is farmed. It has a poor potential for urban uses and for grasses and trees.

The soil is poorly suited to trees, but most of the acreage is in low-quality woodland.

This soil is suited to wildlife habitat and for use as watersheds. Capability subclass VIIs.

55D—Lehew fine sandy loam, 7 to 25 percent slopes. This moderately deep, sloping to moderately steep, well drained to excessively drained soil is on generally broad, convex mountaintops. Slopes are smooth to irregular, commonly complex, and about 200 to 600 feet long. Areas of this soil are commonly long and winding. They range from 5 to more than 75 acres.

Typically, the surface layer is reddish brown fine sandy loam about 7 inches thick. The subsoil is yellowish red channery loam and very channery fine sandy loam about 19 inches thick. The substratum is reddish brown very flaggy fine sandy loam 6 inches thick. Sandstone bedrock is at a depth of 32 inches.

Included with this soil in mapping are small, intermingled areas of Berks and Hazleton soils that make up about 10 percent of this unit. Also included are small areas of channery, flaggy, or stony soils that make up about 5 percent of the unit.

Permeability is moderate to rapid in this soil, and available water capacity is low. Runoff is medium to rapid. Tilth is fair, but the soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 20 to 32 inches. The surface layer and the subsoil are very strongly

acid. Bedrock is at a depth of 20 to 40 inches. The hazard of erosion is moderate to severe.

This soil has poor to fair potential for farming, and most of the acreage is in pasture or woodland. The soil has poor to fair potential for most urban uses and fair potential for grasses and trees.

This soil is poorly suited to cultivated crops and is moderately well suited to pasture and hay. The soil is droughty during the growing season. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

The soil is moderately well suited to trees, and a large acreage is wooded. The soil is managed for hardwoods and pines. The use of logging equipment is limited on the steeper slopes.

This soil is limited for most urban uses by depth to bedrock and moderately steep slopes. The inaccessibility of many areas is a limitation. Capability subclass IVe.

56D—Lehew fine sandy loam, rocky, 7 to 25 percent slopes. This moderately deep, sloping to moderately steep, well drained to excessively drained soil is on generally broad, convex mountaintops. Slopes are smooth to irregular, are commonly complex, and are about 200 to 600 feet long. This soil has areas of rock outcrop 100 to 300 feet apart. Areas of this soil are commonly long and winding. They range from 5 to more than 75 acres.

Typically, the surface layer is reddish brown fine sandy loam about 7 inches thick. The subsoil is yellowish red channery loam and very channery fine sandy loam about 19 inches thick. The substratum is reddish brown very flaggy fine sandy loam 6 inches thick. Sandstone bedrock is at a depth of 32 inches.

Included with this soil in mapping are small, intermingled areas of Berks and Hazleton soils that make up about 10 percent of this unit. Also included are small areas of flaggy or stony soils and small areas of soils with a silt loam subsoil and shaly substratum.

Permeability is moderate to rapid in this soil, and available water capacity is low. Runoff is medium to rapid. Tilth is fair. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 20 to 32 inches. The surface layer and subsoil are very strongly acid unless lime has been applied. Bedrock is at a depth of 20 to 40 inches. The hazard of erosion is severe.

This soil has poor potential for farming, and most of the acreage is in pasture or woodland. It has poor potential for many urban uses and fair potential for grasses and trees.

This soil is poorly suited to cultivated crops and moderately well suited to pasture and hay. The soil is droughty during the growing season. Rock outcrops interfere with tillage operations. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is moderately well suited to trees, and a large acreage is wooded. The soil is managed for hardwoods and pines. The use of logging equipment is limited on the steeper slopes.

This soil is limited for most urban uses by depth to bedrock and moderately steep slopes. Capability subclass IVe.

57E—Lehew flaggy fine sandy loam, 25 to 45 percent slopes. This moderately deep, steep, well drained to excessively drained soil is on the upper side slopes of mountains. Slopes are smooth to irregular, commonly complex, and about 200 to 800 feet long. Areas of this soil are commonly long and winding. They range from 5 to more than 150 acres.

Typically, the surface layer is reddish brown flaggy fine sandy loam about 7 inches thick. The subsoil is yellowish red channery loam and very channery fine sandy loam about 19 inches thick. The substratum is reddish brown very flaggy fine sandy loam 6 inches thick. Sandstone bedrock is at a depth of 32 inches.

Included with this soil in mapping are small, intermingled areas of Berks and Hazleton soils that make up about 10 percent of this unit. Also included are small areas of stony or very stony soils that make up about 5 percent of the unit.

Permeability is moderate to rapid in this soil, and available water capacity is low. Runoff is rapid. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 20 to 32 inches. The surface layer and subsoil are very strongly acid. Bedrock is at a depth of 20 to 40 inches. The hazard of erosion is severe.

This soil has no potential for farming, and none of the acreage is farmed. It has poor potential for urban uses and fair potential for grasses and trees.

This soil is not suited to cultivated crops and is moderately well suited to pasture. It is droughty during the growing season. Controlling erosion, maintaining a mixture of grasses and legumes, and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures and deferment of grazing are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is moderately well suited to trees, and a large acreage is wooded. The soil is managed for hardwoods and pines. The use of logging equipment is limited by steep slopes.

This soil is limited for urban uses by depth to bedrock and steep slopes. The inaccessibility of many areas is a limitation. Capability subclass VIIs.

57F—Lehew flaggy fine sandy loam, 45 to 70 percent slopes. This moderately deep, very steep, well drained to excessively drained soil is on convex mountain side slopes. Slopes are smooth to irregular, commonly complex, and about 300 to 1,000 feet long. Areas of this soil are commonly long and winding. They range from 20 to more than 500 acres.

Typically, the surface layer is reddish brown flaggy fine sandy loam about 5 inches thick. The subsoil is yellowish red channery loam and very channery fine sandy loam about 19 inches thick. The substratum is reddish brown very flaggy fine sandy loam 8 inches thick. Sandstone bedrock is at a depth of 32 inches.

Included with this soil in mapping are small, intermingled areas of Berks and Hazleton soils that make up about 10 percent of this unit. Also included are small areas of stony or very stony soils and small areas of rock outcrop that make up about 5 percent of the unit.

Permeability is moderate to rapid in this soil, and available water capacity is low. Runoff is rapid. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 20 to 32 inches. The surface layer and subsoil are very strongly acid. Bedrock is at a depth of 20 to 40 inches. The hazard of erosion is severe.

This soil has poor potential for farming and urban uses. It has poor potential for grasses and fair potential for trees.

This soil is not suited to cultivated crops or to pasture and hay. The soil is droughty during the growing season. The hazard of erosion is a major limitation.

This soil is moderately well suited to trees, and most of the acreage is wooded. The soil is managed for hardwoods and pines. The use of logging equipment is restricted by very steep slopes.

This soil is limited for urban uses by very steep slopes and depth to bedrock. Capability subclass VIIs.

58D—Lew very stony silt loam, 7 to 25 percent slopes. This deep, sloping to moderately steep, well drained soil is on upper side slopes of the Blue Ridge Mountains. Slopes are smooth and slightly convex, commonly complex, and 300 to 600 feet long. Stones cover about 3 to 15 percent of the surface of this soil. Areas are rectangular or elongated. They range from 5 to more than 75 acres.

Typically, the surface layer is dark brown channery silt loam about 11 inches thick. The upper part of the subsoil is dark brown and strong brown channery and very channery silty clay loam 20 inches thick. The lower part of the subsoil is yellowish red very channery light silty clay loam to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Cataska and Hartleton soils that make up about 10 percent of this unit. Also included are extremely stony areas and areas of rock outcrop that make up about 10 percent of the unit.

Permeability of this soil is moderate, and available water capacity is medium. Runoff is medium to rapid. The soil is medium in natural fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of more than 60 inches. The surface layer and subsoil are commonly strongly acid or very strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil has poor to fair potential for farming, and much of the acreage is in woodland. The soil has poor potential for most urban uses, fair potential for grasses, and very good potential for trees.

This soil is not suited for cultivated crops or hay but is moderately well suited to pasture. Controlling erosion, establishing and maintaining a mixture of grasses and legumes, and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is well suited to trees, and a large acreage is wooded. The soil is managed for hardwoods and pines. The use of logging equipment is limited on the steeper slopes.

This soil is limited for most urban uses by stoniness and slope. Capability subclass VIs.

59E—Lew bouldery silt loam, 10 to 45 percent slopes. This deep, sloping to steep, well drained soil is on side slopes of the Blue Ridge Mountains. Slopes are smooth or slightly convex, commonly complex, and 300 to 900 feet long. Boulders cover about 3 to 40 percent of the surface. Areas of this soil are rectangular or elongated. They range from 5 to more than 100 acres.

Typically, the surface layer is dark brown channery silt loam about 11 inches thick. The upper part of the subsoil is dark brown and strong brown channery and very chan-

nery silty clay loam 20 inches thick. The lower part of the subsoil is yellowish red very channery light silty clay loam to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Cataska and Hartleton soils that make up about 10 percent of this unit. Also included are areas of very stony and extremely stony soils and areas of rock outcrop. These make up about 10 percent of the unit.

Permeability of this soil is moderate, and available water capacity is medium. Runoff is rapid. The soil is medium in natural fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of more than 60 inches. The surface layer and subsoil are commonly strongly acid or very strongly acid. The hazard of erosion is severe.

This soil has little or no potential for farming, and much of the acreage is in woodland. The soil has poor potential for many urban uses, poor potential for grasses, and good potential for trees.

This soil is not suited to cultivated crops or hay and is poorly suited to pasture. The hazard of erosion is a major limitation.

This soil is well suited to trees, and a large acreage is wooded. The soil is managed for hardwoods and pines. The use of logging equipment is limited by boulders and steep slopes.

This soil is limited for most urban purposes by boulders and slope. Capability subclass VIIs.

59F—Lew bouldery silt loam, 45 to 70 percent slopes. This deep, very steep, well drained soil is on upper side slopes of the Blue Ridge Mountains. Slopes are smooth or slightly convex, commonly complex, and 300 to 1,000 feet long. Boulders cover about 3 to 40 percent of the surface. Areas of this soil are rectangular or elongated. They range from 5 to more than 200 acres.

Typically, the surface layer is dark brown channery silt loam about 8 inches thick. The subsoil extends to a depth of more than 60 inches. It is dark brown and strong brown channery and very channery silty clay loam to a depth of 31 inches and is yellowish red very channery light silty clay loam at a depth of more than 31 inches.

Included with this soil in mapping are small, intermingled areas of Cataska and Hartleton soils that make up about 15 percent of this unit. Also included are very stony and extremely stony areas, areas of rubble, and areas of rock outcrop. These make up about 25 percent of the unit.

Permeability is moderate in this soil, and available water capacity is medium. Runoff is rapid. The soil is medium in natural fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of more than 60 inches. The surface layer and subsoil are commonly strongly acid or very strongly acid. The hazard of erosion is severe.

This soil has no potential for farming, and none of the acreage is farmed. It has poor potential for urban uses, poor potential for grasses, and good potential for trees.

This soil is not suited for cultivated crops, hay, or pasture. The hazard of erosion is a major limitation.

The soil is well suited to trees, and a large acreage is wooded. The soil is managed for hardwoods and pines. The use of logging equipment is limited by very steep slopes, boulders, areas of rubble, and bedrock escarpments.

This soil is limited for urban purposes because of boulders and very steep slopes.

This soil is suited to wildlife habitat and for watersheds. Capability subclass VIIs.

60—Massanetta silt loam. This nearly level, moderately well drained soil is on flood plains 100 to 1,200 feet wide. Areas of this soil commonly are long and narrow. They range from 3 to 150 acres. Slopes are 0 to 2 percent.

Typically, the surface layer is very dark gray silt loam about 9 inches thick. The subsoil is gray or dark gray, friable silty clay loam and silt loam about 35 inches thick. The substratum is mottled, gray and yellowish brown clay and silty clay to a depth of more than 60 inches.

Included with this soil in mapping are small areas of Udifluvents that make up about 5 percent of this unit. Also included are a few small areas of wet soils and cobbly or gravelly soils. These make up about 5 percent of the unit.

Permeability of this soil is moderate, and available water capacity is moderate. Runoff is slow. The soil is high in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are mildly alkaline or moderately alkaline. A seasonal high water table is within 18 inches of the surface during winter and early spring. This soil is subject to flooding during periods of high rainfall. The hazard of erosion is slight.

This soil has fair potential for farming. Much of the acreage is in pasture. The potential for urban uses is poor. The soil has good potential for grasses and trees.

This soil is moderately well suited to cultivated crops and is suited to pasture and hay. Alfalfa is short lived because of seasonal wetness. Control of flooding is a management concern. The use of fertilizer helps to maintain fertility. If the soil is cultivated, the use of cover crops and including grasses and legumes in the cropping system help to maintain organic matter content and tilth. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of fertilizer are suitable practices of pasture management. If pastures are overgrazed, some of the desirable grasses and legumes die out. Grazing during periods of seasonal wetness cuts up and compacts the surface layer.

This soil is suited to trees, but only a very small acreage is wooded. The soil is managed for pines and hardwoods.

The use of timber harvesting equipment is limited by seasonal wetness.

This soil is limited for urban purposes by a seasonal high water table during winter and early spring and by flooding. Capability subclass IIIw.

61B—Millrock loamy fine sand, 0 to 4 percent slopes. This deep, nearly level to very gently sloping, well drained soil is on flood plains. Areas of this soil border the major streams and rivers and are commonly long and narrow. The areas range from 3 to 100 acres.

Typically, the surface layer is dark brown loamy fine sand about 8 inches thick. The subsoil is dark reddish brown and reddish brown loamy fine sand and loamy sand 35 inches thick. The substratum is reddish brown and dark brown loamy sand to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Buckton, Chavies, Wheeling, Tioga, and Craigsville soils. Also included are small areas of soils with a fine sandy loam surface layer. Included soils make up 15 to 25 percent of this unit.

Permeability of this soil is rapid, and available water capacity is low. Runoff is slow. The soil is medium in natural fertility and low in organic matter content. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly slightly acid to neutral unless lime has been applied. This soil is very briefly flooded in places during periods of high rainfall.

This soil has a good potential for farming, and most of the acreage is in crops or grasses. The soil has very poor potential for urban uses and good potential for trees and grasses.

This soil is suited to cultivated crops and to pasture and hay. Controlling flooding and increasing organic matter content are major management concerns. The use of fertilizer and lime helps to offset acidity and increase fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to improve tillage and prevent stream scouring. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of fertilizer and lime are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazards of scouring and erosion increase.

The soil is well suited to trees, but only a small acreage is wooded. The soil is managed for hardwoods and pines.

This soil is limited for most urban uses by flooding. Capability subclass IIIs.

62B—Monongahela fine sandy loam, 0 to 7 percent slopes. This nearly level to gently sloping, moderately well drained soil is on broad terraces along rivers and major streams. Slopes are smooth and are about 200 to 1,000 feet long. Areas of this soil are commonly irregular in shape. They range from 3 to more than 100 acres.

Typically, the surface layer is yellowish brown fine sandy loam about 9 inches thick. The upper part of the subsoil is 19 inches of yellowish brown sandy clay loam with a few very pale brown streaks in the lower part. The lower part of the subsoil is a dense, compact fragipan 24 inches thick. It is yellowish brown sandy clay loam and gravelly sandy clay loam with light gray, very pale brown, or strong brown mottles. The substratum is mixed yellowish brown, strong brown, and light brownish gray light clay loam to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Allegheny, Purdy, Cotaco, and Buchanan soils that make up about 20 percent of this unit. Also included are small spots of soils with a silt loam surface layer, soils with a cobbly surface layer, and small wet spots. These inclusions make up less than 5 percent of the unit.

Permeability of this soil is moderate above the fragipan, and it is moderately slow or slow in the fragipan. Available water capacity is medium. Runoff is slow to medium. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 28 inches. Root growth is restricted by the fragipan at a depth of about 20 to 30 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is moderate.

This soil has fair potential for farming, but only a small acreage is farmed. The soil has fair potential for some urban uses. It has good potential for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay. The hazard of erosion on the more sloping areas and seasonal wetness in the nearly level areas are the main limitations. Alfalfa is commonly short lived because of seasonal wetness and restricted root growth. The soil is droughty during the growing season. Tilth is generally good. The use of lime and fertilizer helps to offset acidity and increase fertility. Artificial drainage helps to alleviate spring wetness. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable methods of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase. Grazing during periods of seasonal wetness cuts up and compacts the surface layer and increases erosion.

This soil is suited to trees, and a large acreage is wooded. This soil is managed for pines and hardwoods. The use of logging equipment is limited during periods of wetness.

This soil is limited for most urban uses by a seasonal high water table that is perched above the fragipan. Capability subclass IIw.

62C—Monongahela fine sandy loam, 7 to 15 percent slopes. This sloping, moderately well drained soil is on broad terraces along rivers and major streams and adjacent to mountain foot slopes. Slopes are smooth and are about 200 to 800 feet long. Areas of this soil are commonly irregular in shape. They range from 3 to more than 80 acres.

Typically, the surface layer is yellowish brown fine sandy loam about 9 inches thick. The upper part of the subsoil is 19 inches of yellowish brown sandy clay loam with a few very pale brown streaks in the lower part. The lower part of the subsoil is a dense, compact fragipan 24 inches thick. It is yellowish brown sandy clay loam and gravelly sandy clay loam with light gray, very pale brown, or strong brown mottles. The substratum is mixed yellowish brown, strong brown, and light brownish gray light clay loam to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Allegheny, Purdy, Cotaco, and Buchanan soils that make up about 10 percent of this unit. Also included are small spots of soils with a silt loam surface layer, soils with a cobbly surface layer, and small wet spots. These inclusions make up 10 percent of the unit.

Permeability of this soil is moderate above the fragipan, and it is moderately slow or slow in the fragipan. Available water capacity is medium. Runoff is medium to rapid. Tilth is good, but the soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 28 inches. Root growth is severely restricted by the fragipan commonly at a depth of about 20 to 30 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil has fair potential for farming, but only a small acreage is farmed. The soil has fair potential for some urban uses. It has good potential for grasses and trees.

This soil is moderately well suited to cultivated crops and to pasture and hay. Alfalfa is commonly short lived because of seasonal wetness and restricted root growth. The soil is droughty during the growing season. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase. Grazing during periods of seasonal wetness cuts up and compacts the surface layer and increases erosion.

This soil is suited to trees, but only a small acreage is wooded. The soil is managed for pines and hardwoods. The use of logging equipment is limited during periods of wetness.

This soil is limited for many urban uses by a seasonal high water table that is perched above the fragipan. Water movement downslope across the top of the fragipan is common. Capability subclass IIIe.

63B—Monongahela cobbly fine sandy loam, 0 to 7 percent slopes. This nearly level to gently sloping, moderately well drained soil is on broad terraces of rivers and major streams. Slopes are smooth and are about 200 to 4,000 feet long. Areas of this soil are commonly irregular in shape. They range from 3 to 500 acres.

Typically, the surface layer is yellowish brown cobbly fine sandy loam about 9 inches thick. The upper part of the subsoil is 19 inches of yellowish brown sandy clay loam with a few very pale brown streaks in the lower part. The lower part of the subsoil is a dense, compact fragipan 24 inches thick. It is yellowish brown sandy clay loam and gravelly sandy clay loam with light gray, very pale brown, or strong brown mottles. The substratum is mixed yellowish brown, strong brown, and light brownish gray light clay loam to a depth of more than 60 inches.

Included with this soil in mapping are small areas of Allegheny, Purdy, Cotaco, and Buchanan soils that make up about 20 percent of this unit. Also included are small spots of soils with a silt loam surface layer and small wet spots. These inclusions make up less than 5 percent of the unit.

Permeability of this soil is moderate above the fragipan, and it is moderately slow or slow in the fragipan. Available water capacity is medium. Runoff is slow to medium. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 28 inches. Root growth is restricted by the fragipan commonly at a depth of about 20 to 30 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is moderate.

This soil has fair potential for farming, but only a small acreage is farmed. The soil has fair potential for some urban uses. It has fair potential for grasses and good potential for trees.

This soil is moderately well suited to cultivated crops and to pasture and hay. Tilth is good, but cobbles and pebbles interfere with tillage. Alfalfa is commonly short lived because of seasonal wetness and restricted root growth. The soil is droughty during the growing season. Controlling erosion on the more sloping areas and increasing organic matter content are management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and

legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface. Artificial drainage helps to alleviate wetness in the spring.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase. Grazing during periods of seasonal wetness cuts up and compacts the surface layer and increases erosion.

This soil is suited to trees, and a large acreage is wooded. The soil is managed for pines and hardwoods. The use of logging equipment is limited during periods of wetness.

This soil is limited for many urban uses by a seasonal high water table that is perched above the fragipan. Capability subclass IIw.

63C—Monongahela cobbly fine sandy loam, 7 to 15 percent slopes. This sloping, moderately well drained soil is on broad terraces of rivers and major streams and adjacent to mountain foot slopes. Slopes are smooth and are about 200 to 800 feet long. Areas of this soil are commonly irregular in shape. They range from 3 to more than 100 acres.

Typically, the surface layer is yellowish brown cobbly fine sandy loam about 9 inches thick. The upper part of the subsoil is 19 inches of yellowish brown sandy clay loam with a few very pale brown streaks in the lower part. The lower part of the subsoil is a dense, compact fragipan 24 inches thick. It is yellowish brown sandy clay loam and gravelly sandy clay loam with light gray, very pale brown, or strong brown mottles. The substratum is mixed yellowish brown, strong brown, and light brownish gray light clay loam to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Allegheny, Purdy, Cotaco, and Buchanan soils that make up about 25 percent of this unit. Also included are small spots of soils with a silt loam surface layer and small wet spots. These inclusions make up less than 5 percent of the unit.

Permeability of this soil is moderate above and below the fragipan, and it is moderately slow or slow in the fragipan. Available water capacity is medium. Runoff is medium to rapid. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 28 inches. Root growth is restricted by the fragipan commonly at a depth of about 20 to 30 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is severe.

This soil has poor to fair potential for farming, and only a small acreage is farmed. The soil has fair potential for some urban uses. It has fair potential for grasses and good potential for trees.

This soil is poorly suited to cultivated crops and moderately well suited to pasture and hay. Alfalfa is commonly short lived because of seasonal wetness and restricted root growth. The soil is droughty during the growing season. Tilth is good, but cobbles and pebbles damage tillage equipment and interfere with planting. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer is suitable for this soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase. Grazing during periods of seasonal wetness cuts up and compacts the surface layer and increases erosion.

This soil is suited to trees, and a large acreage is wooded. The soil is managed for pines and hardwoods. The use of logging equipment is limited during periods of wetness.

This soil is limited for some urban uses by a seasonal high water table that is perched above the fragipan. Downslope movement of water on top of the fragipan causes seepage. Capability subclass IVe.

64C—Nixa very cherty silt loam, 2 to 15 percent slopes. This gently sloping to sloping, moderately well drained soil is at the base of or along the lower slopes of knolls and ridges. Slopes are smooth, slightly complex, and 100 to 500 feet long. Areas of this soil are rectangular or elongated. They range from 3 to 20 acres.

Typically, the surface and subsurface layers are pale brown and very pale brown very cherty silt loam about 15 inches thick. The upper part of the subsoil is a fragipan of mottled, light yellowish brown very cherty silt loam 19 inches thick. The lower part of the subsoil is dark yellowish brown cherty silty clay loam and brownish yellow cherty silt loam to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Elliber and Timberville soils that make up about 5 to 10 percent of this unit. Also included are a few sinkholes, a few wet spots, a few small areas of soils with less chert than this Nixa soil, and a few areas of chert boulders. These make up about 5 percent of the unit.

Permeability of this soil is very slow, and available water capacity is low. Runoff is medium to rapid. This soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone is restricted by the fragipan commonly at a depth of 15 inches. The surface layer of this soil is commonly medium acid to

strongly acid, and the subsoil is strongly acid to very strongly acid unless lime has been applied.

This soil has poor potential for farming, and much of the acreage is wooded. The soil has poor potential for many urban uses and fair potential for grasses and trees.

This soil is not suited to cultivated crops and is poorly suited to pasture. It is very droughty during the growing season. Chert fragments in the plow layer interfere with tillage. Maintaining a mixture of grasses and legumes and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures and deferment of grazing are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is moderately well suited to trees, and most of the acreage is wooded. The soil is managed mostly for hardwoods.

This soil is limited for many urban uses by very slow permeability and the high content of chert fragments. Capability subclass VIs.

64D—Nixa very cherty silt loam, 15 to 25 percent slopes. This moderately steep, moderately well drained soil is along the lower slopes of knolls and ridges. Slopes are slightly concave and are 100 to 500 feet long. Areas of this soil are long and narrow. They range from 3 to 20 acres.

Typically, the surface and subsurface layers are pale brown and very pale brown very cherty silt loam about 15 inches thick. The upper part of the subsoil is a fragipan of mottled, light yellowish brown very cherty silt loam 19 inches thick. The lower part of the subsoil is dark yellowish brown cherty silty clay loam and brownish yellow cherty silt loam to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Elliber and Frederick soils that make up about 5 to 10 percent of this unit. Also included are a few sinkholes, a few wet spots, a few small areas of soils with less chert than this Nixa soil, and a few areas of chert boulders. These make up about 5 percent of the unit.

Permeability of this soil is very slow, and available water capacity is very low. Runoff is rapid. This soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone is severely restricted by the fragipan commonly at a depth of 15 inches. The surface layer of this soil is commonly medium acid to strongly acid, and the subsoil is strongly acid to very strongly acid.

This soil has poor potential for farming, and much of the acreage is wooded. The soil has poor potential for most urban uses, poor potential for grasses, and fair potential for trees.

This soil is not suited to cultivated crops and is poorly suited to pasture. It is very droughty during the growing season. The high content of chert fragments in the surface layer is a major limitation. Maintaining a mixture of grasses and legumes and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures and deferment of grazing are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is moderately well suited to trees, and most of the acreage is wooded. The soil is managed mostly for hardwoods.

This soil is limited for many urban purposes by very slow permeability, slope, and the high content of chert fragments. Capability subclass VIIs.

65E—Opequon-Rock outcrop complex, 7 to 45 percent slopes. This unit consists of shallow, sloping to steep, well drained soils and outcrops of limestone that are so intermingled that it was not practical to map them separately. The soils are on side slopes of hills and ridges. Slopes are irregular, commonly complex, and 200 to 600 feet long. Rock outcrops are 30 to 100 feet apart. Areas of this unit are irregular in shape. They range from 3 to 50 acres. This unit is about 45 percent Opequon soils, 45 percent Rock outcrop, and 10 percent included soils.

Typically, the surface layer of the Opequon soils is dark yellowish brown silty clay loam about 3 inches thick. The upper part of the subsoil is reddish brown silty clay loam 3 inches thick. The lower part of the subsoil is yellowish red clay 7 inches thick. Limestone bedrock is at a depth of 13 inches.

Included with this unit in mapping are small areas of soils that have a dark red subsoil and that are deeper to bedrock than the Opequon soils in this unit. These soils make up about 5 percent of this unit. Also included are small gullies that make up about 5 percent of the unit.

Permeability is moderate to slow in the soils of this unit, and available water capacity is low. Runoff is rapid. The Opequon soils have medium natural fertility and low organic matter content. The subsoil has a high shrink-swell potential. The root zone extends to a depth of about 12 inches. The soils are slightly acid to neutral.

This unit has poor potential for crops and pasture, urban uses, and trees. The main limitations for these uses are the areas of Rock outcrop, slope, and shallow depth to bedrock.

Most areas of this unit are used for pasture or woodland. Eastern redcedar is the dominant tree species. Capability subclass VIIs.

66—Philo silt loam. This deep, nearly level, moderately well drained soil is on flood plains. Areas of this soil border rivers and major streams and commonly are long and narrow. The areas range from 3 to 40 acres. Slopes are 0 to 2 percent.

Typically, the surface layer is very dark grayish brown silt loam about 7 inches thick. The subsoil is yellowish brown and pale brown fine sandy loam and sandy loam about 26 inches thick. The substratum is pale brown gravelly and very cobbly loamy fine sand to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of wet spots and soils that are not so well drained as this Philo soil. These make up about 5 percent of this unit.

Permeability of this soil is moderate. Available water capacity is medium. Runoff is slow. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches but is restricted in some places by layers of gravel and cobbles at a depth of 30 to 40 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless lime has been applied. The hazard of erosion is slight. The soil is briefly flooded in places during high rainfall periods. The water table is within 24 inches of the surface during winter and early spring.

This soil has good potential for farming. Much of the acreage is used for pasture or hay. The soil has poor potential for most urban uses. It has a good potential for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay. Alfalfa is short lived because of seasonal wetness. Controlling flooding and seasonal wetness and increasing organic matter content are the main management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soil is cultivated, providing drainage, using cover crops, and including grasses and legumes in the cropping system help to increase organic matter content and maintain tilth. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes, proper grazing, and providing drainage are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, some of the desirable grasses and legumes die out. Grazing during periods of seasonal wetness cuts up and compacts the surface layer.

This soil is suited to trees, but only a small acreage is wooded. The soil is managed for hardwoods and pines. The use of logging equipment is limited during periods of seasonal wetness.

This soil is limited for most urban uses by flooding and seasonal wetness. Capability subclass IIw.

66X—Pits and dumps. This unit consists of open excavations from which limestone, manganese, or sand are mined and of dumps containing waste material. Pits make up approximately 80 percent of this unit and dumps 20 percent. The soil material has either been destroyed during excavation or has been covered with waste material. Little or no vegetation will grow in these areas, and in some of the pits, pools of water are common.

The limestone pits are throughout the county. They range from less than 5 to more than 200 acres. Material from these pits is or has been used mostly for road construction. Some of the material is used as a source of agricultural lime and of material for cement.

The manganese pits are along the western lower slopes of the Blue Ridge Mountains. They range to more than 100 acres in size.

The sand pits are mostly between the South River and the foot of the Blue Ridge Mountains. These pits are a source of sand for building and other commercial purposes.

Included with unit in mapping are several small gravel pits mostly along South River, a shale pit on North Mountain, a chalk mine in the southeastern corner of the county, and several trash dumps.

Pits and dumps have poor potential for farming, urban uses, woodland, and wildlife habitat. The potential of these areas for urban and recreational uses ranges from fair to poor. Onsite investigation must be made and each site considered individually.

These areas are poorly suited to farming and woodland because of lack of soil material, shallow depth to bedrock, or droughtiness.

These areas are limited for urban and recreational uses, but some of the larger pits that contain water may be used for fishing and boating. Capability subclass not assigned.

67—Purdy silt loam. This nearly level, poorly drained soil is in slightly concave depressions or slightly concave areas at the heads of drainageways and is along drainageways on terraces. Areas of this soil are oval or long and narrow and are about 200 to more than 1,000 feet wide. They range from 5 to 30 acres. Slopes are 0 to 2 percent.

Typically, the surface layer is dark gray silt loam about 3 inches thick. The upper part of the subsoil is mottled, gray silty clay, clay, and silty clay loam 40 inches thick. The lower part of the subsoil is 7 inches thick. It is red and yellowish brown cobbly silty clay loam with streaks of gray clay. The substratum is mixed red, brown, yellow, and gray cobbly light silty clay loam to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Buchanan and Monongahela soils that make up about 10 to 15 percent of this unit. Also included are small areas of very poorly drained soils and small spots of soils that are medium acid to neutral. These make up about 5 percent of the unit.

Permeability of this soil is slow to very slow, and available water capacity is medium. Runoff is slow. The soil is low in natural fertility and medium in organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches but is restricted by saturation during long wet periods. The surface layer and subsoil are very strongly acid to strongly acid unless lime has been applied. The hazard of erosion is slight. A seasonal high water table is at or near the surface during winter and early spring. In some areas of

this soil, runoff from surrounding higher lying areas is ponded.

This soil has poor to fair potential for farming. Much of the acreage is wooded. The soil has poor potential for most urban uses. It has fair potential for grasses and good potential for trees.

This soil is poorly suited to cultivated crops and moderately well suited to pasture and hay. Alfalfa is short lived because of seasonal wetness. Tilth is good, but the soil is generally cold and wet in spring. Providing drainage is a major management concern. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soil is cultivated, the use of cover crops and including grasses and legumes in the cropping system help to increase organic matter content and maintain tilth. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes, proper grazing, and providing drainage are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, some of the desirable grasses and legumes die out. Grazing during periods of seasonal wetness cuts up and compacts the surface layer.

This soil is suited to trees, and a large acreage is wooded. The soil is managed for pines and hardwoods. The use of logging equipment is limited during prolonged periods of wetness.

This soil is limited for many urban uses by the seasonal high water table during winter and spring and by ponding. Capability subclass IVw.

68E—Rock outcrop-Chilhowie complex, steep. This unit consists of outcrops of limestone and moderately deep, steep Chilhowie soils that are so intermingled that it was not practical to map them separately. The unit is on sides slopes of hills and ridges in the limestone valley. Slopes are irregular, commonly complex, and 100 to 800 feet long. Rock outcrops are less than 30 feet apart. Areas of this unit are rectangular. They range from 3 to 30 acres or more. This unit is about 45 percent Rock outcrop, 45 percent Chilhowie soils, and 10 percent included soils. Slopes are mostly 25 to 45 percent.

Typically, the surface layer of the Chilhowie soils is brown silty clay loam about 5 inches thick. The subsoil is strong brown, firm, sticky clay about 8 inches thick. The substratum is yellowish brown very shaly clay 9 inches thick. Interbedded calcareous shale and limestone are at a depth of 22 inches.

Included with this unit in mapping are small areas of Opequon soils that make up about 10 percent of this unit. Also included are small gullies that make up about 5 percent of the unit.

Permeability of the Chilhowie soils is slow, and available water capacity is low. Runoff is rapid. The soils are medium in natural fertility and low in organic matter content. The surface layer and subsoil are commonly slightly alkaline to mildly alkaline.

This unit has poor potential for most uses. The areas of Rock outcrop, steep slopes, and depth to bedrock are the main limitations.

Most areas of this unit are abandoned and are in underbrush or scrubby eastern redcedar. Capability subclass VIIs.

69F—Rock outcrop-Drall complex, steep. This unit consists of outcrops of sandstone and steep to very steep, well drained to excessively drained Drall soils that are so intermingled that it was not practical to map them separately. The unit is on upper mountain side slopes and mountaintops. Slopes are irregular, commonly complex, and 300 to more than 1,500 feet long. Very steep intermittent drainageways commonly originate in areas of this unit. Rock outcrops are less than 30 feet apart. Massive rock outcrops and rock escarpments are common in this unit. Areas are long and winding. They range from 5 to more than 100 acres. This unit is about 60 percent Rock outcrop, 30 percent Drall soils, and 10 percent included soils. Slopes are mostly 25 to 45 percent.

Typically, the surface layer of the Drall soils is dark grayish brown channery sandy loam about 10 inches thick. The subsoil is yellowish brown very channery loamy sand 21 inches thick. The upper part of the substratum is yellow very channery or channery sand 21 inches thick. The lower part of the substratum is yellowish brown sandy clay 6 inches thick. Hard quartzite rock is at a depth of 58 inches.

Included with this unit in mapping are small, intermingled areas of Hazleton and Leetonia soils that make up about 15 percent of this unit. Also included are areas of Rubble land that make up about 5 percent of the unit.

Permeability of the Drall soils is rapid, and available water capacity is low. Runoff is very rapid. The soils are low in fertility and organic matter content. The surface layer and subsoil are commonly strongly acid to very strongly acid.

This unit has poor potential for most uses. It is better suited to wildlife habitat, esthetic uses, and watersheds than to other uses. Most of the acreage is wooded, but the use of logging equipment is limited by slope and the areas of Rock outcrop. Capability subclass VIIs.

70C—Rock outcrop-Frederick complex, sloping. This unit consists of outcrops of limestone and gently sloping to sloping, well drained Frederick soils that are so intermingled that it was not practical to map them separately. The unit is on side slopes of hills and ridges. Slopes are commonly complex and are 100 to 700 feet long. Rock outcrops are less than 30 feet apart. Sinkholes are common. Areas of this unit are rectangular and range from 3 to 300 acres. This unit is about 55 percent Rock outcrop, 40 percent Frederick soils, and 5 percent included soils. Slopes are mostly 2 to 15 percent.

Typically, the surface layer of the Frederick soils is brown silt loam about 7 inches thick. The upper part of

the subsoil is strong brown silty clay loam 7 inches thick. The lower part of the subsoil is yellowish red clay to a depth of more than 60 inches.

Included with this unit in mapping are small, intermingled areas of Christian, Edom, Endcav, and Timberville soils.

The Frederick soils are slightly acid to strongly acid. Organic matter content is low, and fertility is medium. The subsoil and substratum have moderate permeability. Available water capacity is medium. Runoff is medium to rapid.

This unit has poor potential for crops, poor to fair potential for pasture, and poor potential for most urban uses and woodland. The areas of Rock outcrop are the main limitation.

Most areas of this unit are used for pasture. Part of the acreage is used for low-quality woodland. Capability subclass VIIs.

70E—Rock outcrop-Frederick complex, steep. This unit consists of outcrops of limestone and steep, well drained Frederick soils that are so intermingled that it was not practical to map them separately. The unit is on side slopes of hills and ridges. Slopes are commonly complex and are 100 to 700 feet long. Rock outcrops are less than 30 feet apart. Sinkholes are common. Areas of this unit are rectangular and range from 3 to 300 acres. This unit is about 55 percent Rock outcrop, 30 percent Frederick soils, and 15 percent included soils. Slopes are mostly 15 to 45 percent.

Typically, the surface layer of the Frederick soils is brown silt loam about 7 inches thick. The upper part of the subsoil is strong brown silty clay loam 7 inches thick. The lower part of the subsoil is yellowish red clay to a depth of more than 60 inches.

Included with this unit in mapping are small, intermingled areas of Christian, Edom, and Timberville soils.

The Frederick soils are slightly acid to strongly acid. Organic matter content is low, and fertility is medium. The subsoil and substratum have moderate permeability. Available water capacity is medium. Runoff is rapid.

This unit has poor potential for most uses. Slope and the areas of Rock outcrop are the main limitations.

Most areas of this unit are used for low-quality woodland. A small area is used for pasture. Capability subclass VIIs.

71—Rubble land. This unit is 90 percent or more sandstone and quartzite stones and boulders on steep mountainsides. Most areas have little or no vegetation.

Rubble land has esthetic value but has little potential for other uses. Seeps and springs commonly are downslope from Rubble land. Capability subclass VIIIs.

72F—Rushtown shaly silt loam, 45 to 80 percent slopes. This deep, very steep, well drained soil is on lower side slopes of mountains. Slopes are smooth, slightly concave, and about 100 to 500 feet long. Areas of this soil are long and winding. They range from 5 to more than 100 acres.

Typically, the surface layer is dark brown shaly silt loam about 10 inches thick. The subsoil is strong brown and yellowish brown very shaly silt loam and very shaly loam about 25 inches thick. The substratum is yellowish brown very shaly loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Berks soils that make up about 15 percent of this unit. Also included are small stony areas that are mainly on the lower slopes. These make up less than 3 percent of the unit.

Permeability is rapid in this soil, and available water capacity is low. Runoff is rapid. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to very strongly acid unless lime has been applied.

This soil has no potential for farming, and none of the acreage is farmed. The soil has poor potential for most urban uses, poor potential for grasses, and good potential for trees.

The soil is suited to trees, and almost all of the acreage is wooded. The soil is managed mostly for hardwoods. The use of logging equipment is restricted by very steep slopes.

This soil is limited for most urban uses by very steep slopes. Capability subclass VIIs.

73B2—Sequoia silt loam, 2 to 7 percent slopes, eroded. This gently sloping, well drained soil is on convex knolls and narrow, convex ridgetops. Slopes are smooth, commonly complex, and about 120 to 400 feet long. Areas of this soil are circular and elongated or long and winding. Some larger areas have shallow drainageways 100 to 400 feet apart. Areas of this soil range from 5 to 50 acres.

Typically, the surface layer is yellowish brown silt loam about 8 inches thick. The subsoil is reddish yellow, yellowish red, and strong brown, firm clay and shaly clay about 24 inches thick. The substratum extends to a depth of 60 inches or more. It is light yellowish brown weathered shale containing coatings and lenses of silt.

Included with this soil in mapping are small areas of Berks soils that make up 5 to 15 percent of this unit. Also included are small areas of soils with a silty clay loam surface layer, small spots of wet soils, and small spots of rock outcrop. These make up about 5 to 10 percent of the unit.

Permeability of this soil is moderately slow, and available water capacity is medium. Runoff is medium. The soil is low in natural fertility and organic matter content. Tilth is fair. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches but is restricted at a depth of about 32 inches by shale fragments. The surface layer and subsoil are commonly very strongly acid to medium acid unless lime has been applied. The hazard of erosion is moderate.

The soil has fair potential for farming, and most of the acreage is farmed. The soil has fair potential for some urban uses and good potential for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is suited to trees, but only a small acreage is wooded. The soil is managed mostly for pine.

This soil is limited for many urban uses by moderately slow permeability and a moderate shrink-swell potential. Capability subclass IIe.

73C2—Sequoia silt loam, 7 to 15 percent slopes, eroded. This sloping, well drained soil is on slightly convex side slopes of rolling to hilly uplands. Slopes are smooth, commonly complex, and about 300 to 800 feet long. Areas of this soil are elongated or long and winding. Larger areas have shallow drainageways 100 to 400 feet apart. Areas of this soil range from 5 to 50 acres.

Typically, the surface layer is yellowish brown silt loam about 8 inches thick. The subsoil is mostly reddish yellow, yellowish red, and strong brown, firm clay and shaly clay about 24 inches thick. The substratum extends to a depth of 60 inches or more. It is light yellowish brown weathered shale containing coatings and lenses of silt.

Included with this soil in mapping are small areas of Berks soils that make up about 5 to 10 percent of this unit. Also included are small areas of soils with a silty clay loam surface layer, small spots of wet soils, and small spots of rock outcrop. These make up about 5 to 10 percent of the unit.

Permeability of this soil is moderately slow, and available water capacity is medium. Runoff is medium to rapid. Tilth is fair. The soil is low in natural fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches but is somewhat restricted at a depth of about 32 inches by shale fragments. The surface layer and subsoil are commonly very strongly acid to medium acid unless lime has been applied. The hazard of erosion is severe.

This soil has fair potential for farming, and most of the acreage is farmed. The soil has fair potential for some urban uses and good potential for grasses and trees.

This soil is moderately well suited to cultivated crops and to pasture and hay. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is suited to trees, but only a small acreage is wooded. The soil is managed mostly for pine.

This soil is limited for many urban uses by moderately slow permeability, a moderate shrink-swell potential, and slope. Capability subclass IIIe.

74B2—Sequoia-Berks silt loams, 2 to 7 percent slopes, eroded. These gently sloping, well drained Sequoia and Berks soils are so intermingled that it was not practical to map them separately. These soils are on narrow, convex ridgetops. Slopes are smooth and complex and are about 120 to 400 feet long. Areas of this unit are elongated or long and winding. They range from 5 to 150 acres or more. This unit is about 55 percent Sequoia silt loam, 40 percent Berks silt loam, and 5 percent included soils.

Typically, the surface layer of the Sequoia soil is yellowish brown silt loam about 8 inches thick. The subsoil is mostly reddish yellow, yellowish red, and strong brown, firm clay and shaly clay about 24 inches thick. The substratum extends to a depth of 60 inches or more. It is light yellowish brown weathered shale containing coatings and lenses of silt.

Typically, the surface layer of the Berks soil is dark brown shaly silt loam about 7 inches thick. The subsoil is mostly yellowish brown and strong brown, friable shaly or very shaly silt loam about 20 inches thick. The substratum is yellowish brown, friable very shaly silt loam 3 inches thick. Fractured shale is at a depth of 20 inches.

Included with this unit in mapping are small, intermingled areas of Guernsey and Weikert soils. Also included are small areas of rock outcrop and small spots of wet soils.

Permeability of the Sequoia soil is moderately slow, and available water capacity is medium. Permeability of the Berks soil is moderately rapid, and available water capacity is low. Runoff is medium. The soils are low in natural fertility and organic matter content. The subsoil of the Sequoia soil has a moderate shrink-swell potential. The subsoil of the Berks soil has a low shrink-swell potential. The root zone of the Sequoia soil extends to a depth of about 60 inches but is somewhat restricted at a depth of about 32 inches by shale fragments. The root zone of the

Berks soil extends to bedrock, which is commonly at a depth of 20 to 40 inches. The surface layer and subsoil of these soils are commonly very strongly acid to medium acid unless lime has been applied. The hazard of erosion is severe.

This unit has fair potential for farming, and most of the acreage is farmed. The unit has fair potential for some urban uses and for grasses and trees.

This unit is moderately well suited to cultivated crops and to pasture and hay. The Berks soil is droughty during the growing season. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soils are cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This unit is suited to trees, but only a small acreage is wooded. The soils are managed mostly for pine.

This unit is limited for many urban uses by the moderately slow permeability and moderate shrink-swell potential of the Sequoia soil and by the depth to bedrock of the Berks soil. Capability subclass IIIe.

74C2—Sequoia-Berks silt loams, 7 to 15 percent slopes, eroded. These sloping, well drained Sequoia and Berks soils are so intermingled that it was not practical to map them separately. The soils are on slightly convex side slopes. Slopes are smooth and complex and are about 300 to 800 feet long. Areas of these soils have shallow drainageways about 100 to 400 feet apart. The areas are elongated or long and winding. They range from 5 to 75 or more. This unit is about 55 percent Sequoia silt loam, 40 percent Berks silt loam, and 5 percent included soils.

Typically, the surface layer of the Sequoia soil is yellowish brown silt loam about 8 inches thick. The subsoil is mostly reddish yellow, yellowish red, and strong brown, firm clay and shaly clay about 24 inches thick. The substratum extends to a depth of 60 inches or more. It is light yellowish brown weathered shale containing coatings and lenses of silt.

Typically, the surface layer of the Berks soil is dark brown shaly silt loam about 7 inches thick. The subsoil is mostly yellowish brown and strong brown, friable shaly or very shaly silt loam about 20 inches thick. The substratum is yellowish brown, friable very shaly silt loam 3 inches thick. Fractured shale is at a depth of about 30 inches.

Included with this unit in mapping are small areas of Weikert soil. Also included are small areas of rock outcrop.

Permeability of the Sequoia soil is moderately slow, and available water capacity is medium. Permeability of the Berks soil is moderately rapid, and available water capacity is low. Runoff is medium to rapid. The soils are low in natural fertility and organic matter content. The subsoil of the Sequoia soil has a moderate shrink-swell potential. The subsoil of the Berks soil has a low shrink-swell potential. The root zone of the Sequoia soil extends to a depth of about 60 inches but is somewhat restricted at a depth of about 32 inches by shale fragments. The root zone of the Berks soil extends to bedrock, which is commonly at a depth of 20 to 40 inches. The surface layer and subsoil of these soils are commonly very strongly acid to medium acid unless lime has been applied. The hazard of erosion is severe.

This unit has fair potential for farming, and much of the acreage is farmed. The unit has fair potential for some urban uses and for grasses and trees.

These soils are poorly suited to cultivated crops and moderately well suited to pasture and hay. The Berks soil is droughty during the growing season. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soils are cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This unit is suited to trees, and a moderate acreage is wooded. The soils are managed mostly for pine.

This unit is limited for many urban uses by the moderately slow permeabilty and moderate shrink-swell potential of the Sequoia soil, by the depth to bedrock of the Berks soil, and by slope. Capability subclass IVe.

74D2—Sequoia-Berks silt loams, 15 to 25 percent slopes, eroded. These moderately steep, well drained soils are so intermingled that it was not practical to map them separately. The soils are on slightly convex side slopes. Slopes are smooth to irregular, complex, and about 400 to 1,000 feet long. Areas of this unit have shallow drainageways about 100 to 300 feet apart. The areas are elongated or long and winding. They range from 5 to 40 acres or more. This unit is about 45 percent Sequoia silt loam, 45 percent Berks silt loam, and 10 percent included soils.

Typically, the surface layer of the Sequoia soil is yellowish brown silt loam about 7 inches thick. The subsoil is

mostly yellowish red and yellowish brown, firm clay and clay loam about 24 inches thick. The substratum extends to a depth of 60 inches or more. It is light yellowish brown weathered shale containing coatings and lenses of silt.

Typically, the surface layer of the Berks soil is dark brown shaly silt loam about 5 inches thick. The subsoil is mostly yellowish brown, friable silt loam or shaly silt loam about 18 inches thick. The substratum is yellowish brown, friable very shaly silt loam 7 inches thick. Fractured shale is at a depth of 30 inches.

Included with this unit in mapping are small areas of Weikert soil. Also included are small areas of rock outcrop and small spots of wet soils.

Permeability of the Sequoia soil is moderately slow, and available water capacity is medium. Permeability of the Berks soil is moderately rapid, and available water capacity is low. Runoff is rapid. The soils are low in natural fertility and organic matter content. The subsoil of the Sequoia soil has a moderate shrink-swell potential. The root zone of the Sequoia soil extends to a depth of about 60 inches but is somewhat restricted at a depth of about 31 inches by shale fragments. The root zone of the Berks soil extends to bedrock, which is commonly at a depth of 20 to 40 inches. The surface layer and subsoil of both soils are commonly very strongly acid to medium acid unless lime has been applied. The hazard of erosion is severe.

This unit has poor potential for farming, and a moderate acreage is farmed. The soils have poor potential for many urban purposes and fair potential for grasses and trees.

This unit is poorly suited to cultivated crops and moderately well suited to pasture. The Berks soil is droughty during the growing season. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures and deferment of grazing are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This unit is suited to trees, and a moderate acreage is wooded. The soils are managed mostly for pine. The use of logging equipment is limited by slope.

This unit is limited for many urban purposes by the moderately slow permeability of the Sequoia soil, by the depth to bedrock of the Berks soil, and by slope. Capability subclass VIe.

75B2—Shenval loam, 2 to 7 percent slopes, eroded. This gently sloping, well drained soil is on broad, undulating terraces along larger streams. Areas of this soil are commonly elongated or rectangular. A few small sinkholes are in some areas. The areas are 200 to over 800 feet wide and range from 3 to 50 acres.

Typically, the surface layer is dark brown loam about 9 inches thick. The upper part of the subsoil is reddish brown clay loam 10 inches thick. The lower part of the subsoil extends to a depth of more than 60 inches. It is reddish brown and yellowish red heavy clay loam with yellow and brown mottles in the lower part.

Included with this soil in mapping are small, intermingled areas of Frederick and Allegheny soils and soils with a fragipan that make up about 20 percent of this unit. Also included are small areas of soils with a surface layer of cobbly loam that make up about 5 percent of the unit.

Permeability of this soil is moderate, and available water capacity is medium. Runoff is medium. The soil is medium in natural fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to medium acid unless lime has been applied. The hazard of erosion is moderate.

This soil has good potential for farming, and most of the acreage is farmed. The soil has good potential for many urban uses and for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

The soil is well suited to trees, but only a small acreage is wooded. The soil is managed for pines and hardwoods.

This soil is limited for some urban uses by moderate permeability. Capability subclass IIe.

75C2—Shenval loam, 7 to 15 percent slopes, eroded. This sloping, well drained soil is on broad, undulating terraces along larger streams. Areas of this soil are commonly elongated or rectangular. A few small sinkholes are in some areas. The areas are 200 to more than 600 feet wide and range from 3 to 50 acres.

Typically, the surface layer is dark brown loam about 9 inches thick. The upper part of the subsoil is reddish brown clay loam 10 inches thick. The lower part of the subsoil extends to a depth of more than 60 inches. It is reddish brown and yellowish red heavy clay loam with yellow and brown mottles in the lower part.

Included with this soil in mapping are small, intermingled areas of Frederick and Allegheny soils and soils with a fragipan that make up about 20 percent of this unit. Also included are small areas of soils with a surface layer of

cobbly loam and small spots of severely eroded soils. These soils make up about 5 percent of the unit.

Permeability of this soil is moderate, and available water capacity is medium. Runoff is medium to rapid. The soil is medium in natural fertility and organic matter content. Tilth is good. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to medium acid unless lime has been applied. The hazard of erosion is severe.

This soil has good potential for farming, and most of the acreage is farmed. The soil has fair potential for some urban uses and good potential for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is well suited to trees, but only a small acreage is wooded. The soil is managed for pines and hardwoods.

This soil is limited for some urban purposes by moderate permeability and slope. Capability subclass IIIe.

75D2—Shenval loam, 15 to 25 percent slopes, eroded. This moderately steep, well drained soil is on terrace breaks between terrace levels along larger streams. Areas of this soil are commonly narrow and are elongated or rectangular. A few small sinkholes are in some areas. The areas of this soil are 140 to more than 300 feet wide and range from 3 to 30 acres.

Typically, the surface layer is dark brown loam about 9 inches thick. The upper part of the subsoil is reddish brown clay loam 10 inches thick. The lower part of the subsoil extends to a depth of more than 60 inches. It is reddish brown and yellowish red heavy clay loam with yellow and brown mottles in the lower part.

Included with this soil in mapping are small areas of Frederick soils that make up about 10 percent of this unit. Also included are small areas of soils with a surface layer of cobbly loam and small spots of severely eroded soils. These make up about 10 percent of the unit.

Permeability of this soil is moderate, and available water capacity is medium. Runoff is rapid. The soil is medium in natural fertility and organic matter content. Tilth is good. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to medium acid unless lime has been applied. The hazard of erosion is severe.

This soil has poor to fair potential for farming, and most of the acreage is not farmed. The soil has poor potential for many urban uses and good potential for grasses and trees.

This soil is poorly suited to cultivated crops and moderately well suited to pasture and hay. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is well suited to trees, but only a small acreage is wooded. The soil is managed for pines and hardwoods. The use of timber equipment is limited by slope.

This soil is limited for many urban purposes by slope. Capability subclass IVe.

76C—Shenval cobbly loam, 7 to 15 percent slopes. This sloping, well drained soil is on broad terraces along larger streams. Areas of this soil are commonly elongated or rectangular. A few small sinkholes are in some areas. The areas of this soil are 100 to more than 500 feet wide and range from 3 to 30 acres.

Typically, the surface layer is dark brown cobbly loam about 9 inches thick. The upper part of the subsoil is reddish brown clay loam. The lower part of the subsoil extends to a depth of more than 60 inches. It is reddish brown and yellowish red heavy clay loam with yellow and brown mottles in the lower part.

Included with this soil in mapping are small, intermingled areas of Frederick and Allegheny soils and soils with a fragipan that make up about 20 percent of this unit. Also included are small areas of soils with a surface layer of loam and small spots of severely eroded soils. These make up about 5 percent of the unit.

Permeability of this soil is moderate, and available water capacity is medium. Runoff is medium to rapid. The soil is medium in natural fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to medium acid unless lime has been applied. The hazard of erosion is severe.

This soil has good potential for farming, and most of the acreage is farmed. The soil has fair potential for some urban uses and good potential for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay. Tilth is good, but cobblestones interfere with tillage and planting operations. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer help to offset acidity and increase fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is well suited to trees, but only a small acreage is wooded. The soil is managed for pines and hardwoods.

This soil is limited for some urban purposes by moderate permeability and slope. Capability subclass IIIe.

76D—Shenval cobbly loam, 15 to 25 percent slopes. This moderately steep, well drained soil is on terrace breaks between terrace levels along larger streams. Areas of this soil are commonly narrow and are elongated or rectangular. A few small sinkholes are in some areas. The areas of this soil are 140 to more than 500 feet wide and range from 3 to 50 acres.

Typically, the surface layer is dark brown cobbly loam about 9 inches thick. The upper part of the subsoil is reddish brown clay loam 10 inches thick. The lower part of the subsoil extends to a depth of more than 60 inches. It is reddish brown and yellowish red heavy clay loam with yellowish brown mottles in the lower part.

Included with this soil in mapping are small areas of Frederick soils that make up about 10 percent of this unit. Also included are small areas of soils with a loam surface layer and small spots of severely eroded soils. These make up about 5 percent of the unit.

Permeability of this soil is moderate, and available water capacity is medium. Runoff is rapid. The soil is medium in natural fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to medium acid unless lime has been applied. The hazard of erosion is severe.

This soil has poor potential for farming, and most of the acreage is not farmed. The soil has poor potential for many urban uses and good potential for growing grasses and trees.

This soil is poorly suited to cultivated crops and moderately well suited to pasture and hay. Tilth is good, but cobblestones tend to interfere with tillage and planting operations. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is well suited to trees, but only a small acreage is wooded. The soil is managed for pines and hardwoods. The use of logging equipment is limited by slope.

This soil is limited for many urban uses by slope. Capability subclass IVe.

77C—Sherando sandy loam, 2 to 15 percent slopes. This gently sloping to sloping, well drained to somewhat excessively drained soil is on fans and narrow to somewhat broad foot slopes on mountainous uplands. Slopes are smooth, commonly complex, and about 150 to 2,000 feet long. Areas of this soil are triangular and elongated or long and winding. Larger areas have shallow drainageways about 100 to 800 feet apart. Areas of this soil range from 5 to 250 acres or more.

Typically, the surface layer is pale brown sandy loam about 6 inches thick. The subsoil is light yellowish brown and yellowish brown, friable gravelly and very gravelly sandy loam about 39 inches thick. The substratum is yellowish brown very gravelly sandy loam and very gravelly loamy sand to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Allegheny, Cotaco, and Craigsville soils and soils with a fragipan that make up 15 percent of this unit. Also included are small spots of cobbly and very cobbly soils that make up about 3 percent of this unit.

Permeability of this soil is moderately rapid to rapid. Available water capacity is low. Runoff is medium to rapid. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly very strongly acid to medium acid unless lime has been applied. The hazard of erosion is severe.

This soil has fair potential for farming, and most of the acreage is wooded. The soil has fair potential for some urban uses, fair potential for grasses, and good potential for trees.

This soil is poorly suited to cultivated crops and moderately well suited to pasture. The soil is droughty during the growing season. The hazard of erosion is a main limitation for farming. Establishing and maintaining a mixture of grasses and legumes and preventing overgrazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and

legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is suited to trees, and most of the acreage is wooded. The soil is managed for pines and hardwoods.

This soil is limited for many urban uses mostly by slope and moderately rapid to rapid permeability. Capability subclass IVe.

77D—Sherando sandy loam, 15 to 25 percent slopes. This moderately steep, well drained to somewhat excessively drained soil is on colluvial fans and narrow to broad foot slopes on mountainous uplands. Slopes are smooth, commonly complex, and about 150 to 600 feet long. Areas of this soil are triangular and elongated or long and winding. Larger areas have shallow drainageways about 100 to 300 feet apart. Areas of this soil range from 5 to 50 acres or more.

Typically, the surface layer is pale brown sandy loam about 6 inches thick. The subsoil is light yellowish brown and yellowish brown, friable gravelly and very gravelly sandy loam about 39 inches thick. The substratum is yellowish brown very gravelly sandy loam and very gravelly loamy sand.

Included with this soil in mapping are small areas of Allegheny and Cotaco soils and soils with a fragipan that make up about 10 percent of this unit. Also included are small spots of cobbly and very cobbly soils. These make up less than 3 percent of the unit.

Permeability of this soil is moderately rapid to rapid. Runoff is rapid. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches, but root growth is limited in the subsoil by many coarse fragments. The surface layer and subsoil are commonly very strongly acid to medium acid unless lime has been applied. The hazard of erosion is severe.

This soil has poor potential for farming, and most of the acreage is wooded. The soil has poor potential for many urban uses, fair potential for grasses, and good potential for trees.

This soil is not suited to cultivated crops and moderately well suited to pasture. The soil is droughty during the growing season. The hazard of erosion is a major limitation for farming. Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is suited to trees, and most of the acreage is wooded. The soil is managed for pines and hardwoods. The use of logging equipment is limited by slope.

This soil is limited for many urban uses mostly by slope. Capability subclass VIs.

78C—Sherando cobbly sandy loam, 2 to 15 percent slopes. This gently sloping to sloping, well drained to somewhat excessively drained soil is on colluvial fans and narrow to broad foot slopes on mountainous uplands. Slopes are smooth, commonly complex, and about 150 to 1,500 feet long. Areas of this soil are triangular and elongated or long and winding. Larger areas have shallow drainageways about 100 to 500 feet apart. Areas of this soil range from 5 to 200 acres or more.

Typically, the surface layer is pale brown cobbly sandy loam about 6 inches thick. The subsoil is light yellowish brown and yellowish brown, friable gravelly and very gravelly sandy loam about 39 inches thick. The substratum is yellowish brown very gravelly sandy loam and very gravelly loamy sand to a depth of more than 60 inches.

Included with this soil in mapping are small intermingled areas of Craigsville and Cotaco soils and soils with a fragipan that make up about 10 to 15 percent of this unit.

Permeability of this soil is moderately rapid to rapid. Runoff is medium to rapid. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches, but root growth is restricted in the subsoil by gravel. The surface layer and subsoil are commonly very strongly acid to medium acid unless lime has been applied. The hazard of erosion is severe.

This soil has poor potential for farming, and most of the acreage is wooded. The soil has poor potential for many urban uses, poor potential for grasses, and good potential for trees. Wooded areas of this soil have good potential for watersheds.

This soil is not suited to cultivated crops and moderately well suited to pasture. The soil is droughty during the growing season. Cobblestones interfere with tillage and damage farm equipment. The hazard of erosion is a major limitation for farming. Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

The soil is suited to trees, and most of the acreage is wooded. The soil is managed for pines and hardwoods.

The soil is limited for many urban uses mostly by slope and moderately rapid to rapid permeability. Capability subclass IVs.

78E—Sherando cobbly sandy loam, 15 to 45 percent slopes. This moderately steep to steep, well drained to somewhat excessively drained soil is on terrace breaks and on breaks between mountain slopes and terraces. Slopes are smooth, commonly complex, and about 150 to 1,000 feet long. Areas of this soil are elongated or long and winding. Larger areas have shallow drainageways about 100 to 300 feet apart. Areas of this soil range from 5 to 100 acres or more.

Typically, the surface layer is pale brown cobbly sandy loam about 6 inches thick. The subsoil is light yellowish brown and yellowish brown, friable gravelly and very gravelly sandy loam about 39 inches thick. The substratum is yellowish brown very gravelly sandy loam and very gravelly loamy sand to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Craigsville soils and soils with a fragipan that make up about 10 to 15 percent of this unit.

Permeability of this soil is moderately rapid to rapid. Runoff is rapid. The soil is low in natural fertility and organic matter. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches, but roots are restricted in the subsoil by cobbles and gravel. The surface layer and subsoil are commonly very strongly acid to medium acid. The hazard of erosion is severe.

This soil has very little potential for farming, and most of the acreage is wooded. The soil has poor potential for most urban uses, poor potential for grasses, and fair potential for trees. Wooded areas of this soil have good potential for watersheds.

This soil is not suited to cultivated crops and is poorly suited to pasture. The soil is droughty during the growing season. Cobblestones interfere with tillage. The hazard of erosion is a major limitation for farming. Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is suited to trees, and most of the acreage is wooded. The soil is managed for pines and hardwoods. The use of logging equipment is limited by slope.

This soil is limited for most urban uses by slope. Capability subclass VIIs.

79B—Timberville silt loam, 0 to 7 percent slopes. This deep, nearly level to gently sloping, well drained soil is in upland depressions, on colluvial fans, and on small, narrow flood plains adjacent to smaller streams. Slopes are smooth or slightly concave and are 50 to 400 feet long. Areas of this soil are round or long and winding. They range from 3 to 20 acres.

Typically, the surface layer is dark brown silt loam about 9 inches thick. The subsoil is 18 inches of mainly strong brown cherty silty clay loam underlain to a depth of 60 inches or more by yellowish red silty clay with red and strong brown mottles.

Included with this soil in mapping are small, intermingled areas of Udifluvents, loamy, and Endcav and Frederick soils that make up about 5 to 10 percent of this unit. Also included are small spots of cherty soils and small areas of soils with a surface layer of sandy loam. These soils make up about 5 percent of the unit.

Permeability is moderate in this soil, and available water capacity is medium to high. Runoff is slow to medium. The soil is medium in natural fertility and low in organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and the subsoil are commonly medium acid to very strongly acid unless lime has been applied. This soil is subject to flooding during periods of heavy rainfall.

This soil has good potential for farming, and much of the acreage is farmed. The soil has poor potential for most urban uses and good potential for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay. Flooding is the major hazard of this soil. A main management concern is the need to increase organic matter content. The use of lime and fertilizer is suitable for this soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is well suited to trees, but only a small acreage is wooded. The soil is managed for pines and hardwoods.

This soil is limited for most urban uses by flooding. Capability unit IIw.

80B—Timberville cherty silt loam, 0 to 7 percent slopes. This deep, nearly level to gently sloping, well drained soil is in upland depressions, on colluvial fans, and on small, narrow flood plains adjacent to smaller streams. Slopes are smooth or slightly concave and are 50 to 400 feet long. Areas of this soil are round or long and winding. They range from 3 to 20 acres.

Typically, the surface layer is dark brown cherty silt loam about 9 inches thick. The subsoil is 18 inches of mainly strong brown cherty silty clay loam underlain to a depth of 60 inches or more by yellowish red silty clay with red and strong brown mottles.

Included with this soil in mapping are small, intermingled areas of Udifluvents and Frederick soils that make up about 5 to 10 percent of this unit. Also included are small spots of very cherty soils and small areas of soils with a surface layer of sandy loam. These make up 5 percent of the unit.

Permeability is moderate in this soil, and available water capacity is medium. Runoff is slow to medium. The soil is medium in natural fertility and low in organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and the subsoil are commonly medium acid to very

strongly acid unless lime has been applied. This soil is subject to flooding during periods of heavy rainfall.

This soil has good potential for farming, and much of the acreage is farmed. The soil has poor potential for most urban uses and good potential for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay. Chert fragments interfere with cultivation and seeding operations. Flooding is the major hazard of this soil. A main management concern is the need to increase organic matter content. The use of lime and fertilizer is suitable for this soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is well suited to trees, but only a small acreage is wooded. The soil is managed for pines and hardwoods.

This soil is limited for most urban uses by flooding. Capability unit IIw.

81—Tioga fine sandy loam. This deep, nearly level to very gently sloping, well drained soil is on flood plains. Areas of this soil border major streams and rivers and are commonly long and narrow. The areas range from 3 to 100 acres. Slopes are 0 to 4 percent.

Typically, the surface layer is dark brown fine sandy loam about 9 inches thick. The subsoil is brown loam 21 inches thick. The substratum consists of brown loamy fine sand to a depth of 60 inches or more.

Included with this soil in mapping are small, intermingled areas of Millrock, Buckton, and Chavies soils and small areas of cobbly or gravelly soils. Included soils make up 10 to 25 percent of this unit.

Permeability of this soil is moderate, and available water capacity is low. Runoff is slow. The soil is moderate in natural fertility and low in organic matter content. The root zone extends to a depth of about 60 inches, but root growth is restricted by the sandy texture at a depth of more than 30 inches. The surface layer and subsoil are commonly medium acid to slightly acid unless lime has been applied. This soil is flooded in places for brief periods during periods of heavy rainfall.

This soil has good potential for farming, and most of the acreage is farmed. The soil has very low potential for urban uses and good potential for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay. Flooding is the major hazard of this soil. A main management concern is the need to increase organic matter content. The use of lime and fertilizer is suitable for this soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to improve tillage and prevent scouring. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer to offset acidity and increase fertility are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazards of scouring and erosion increase.

This soil is well suited to trees, but only a very small acreage is wooded. The soil is managed for hardwoods and pines.

This soil is limited for most urban uses by flooding. Capability subclass IIw.

82—Udifluvents, loamy. This unit consists of moderately well drained to somewhat poorly drained, nearly level to very gently sloping, loamy soils on narrow flood plains in valleys. The soils formed in alluvial material washed from soils underlain by limestone, sandstone, and shale. Areas of this unit are mostly elongated and range from 1 acre to more than 60 acres. Some areas have abandoned flood channels, and some have stratified layers of gravel and cobblestones at a depth of more than 30 inches. Slopes are 0 to 3 percent.

Included with this unit in mapping are small areas of Fluvaquents and Buckton and Chagrin soils. Also included are wet spots and small spots of gravelly or cobbly soils. Included areas make up about 15 percent of the mapped acreage of the unit.

Permeability is moderate to slow in the soils of this unit. Available water capacity is medium to high. Runoff is slow. A seasonal high water table is at a depth of 1 1/2 to 2 1/2 feet. These soils are subject to occasional flooding.

These soils have fair potential for pasture and hay and good potential for woodland. They have poor potential for most urban uses and fair potential for some recreational uses such as picnic areas and playgrounds. The soils have good to excellent potential for wildlife habitat and for use as natural areas. Capability subclass not assigned.

83—Udorthents, sandy. This unit consists of well drained to somewhat excessively drained, nearly level to gently sloping, loamy soils on flood plains in valleys. The soils formed in alluvial material that contains various amounts of pebbles and cobblestones and that is washed from soils underlain by sandstone or shale. The areas are mostly elongated and range from 2 to more than 50 acres. These areas commonly have old, abandoned flood channels and cobble and stone chains. Slopes are 0 to 6 percent.

Included in this unit in mapping are small areas of Craigsville, Tioga, and Millrock soils. Also included are small areas of boulders and piles of cobblestones and

stones. Included areas make up about 20 percent of the mapped acreage of this unit.

Permeability is rapid in the soils of this unit. Available water capacity is low. Runoff is slow, and the soils are frequently flooded. Pollution of streams and ground water is a major hazard in using these soils for development.

These soils are used mostly for woodland or poor-quality pasture. They have poor potential for most uses because of flooding, droughtiness, and the high content of cobblestones and stones. The soils have fair to good potential for woodland and for wildlife habitat. Capability subclass not assigned.

84—Udorthents, shaly. This unit consists of well drained to excessively drained, nearly level to gently sloping, shaly soils formed in material on toe slopes of ridges and on colluvial fans. The material is washed from steep adjacent soils underlain by shale. Areas are irregularly shaped to triangular or elongated and are in valleys. The areas range from 2 to 6 acres. Slopes are 0 to 6 percent.

Included with this unit in mapping are small areas of Berks and Weikert soils and small wet spots. These areas make up less than 5 percent of the mapped acreage of the unit.

Permeability is moderate to rapid in the soils of this unit. Available water capacity is low to moderate. Runoff is slow to medium, and the soils receive overflow and seepage from the surrounding soils. The hazard of erosion is slight.

Most of these soils are in pasture or are farmed with adjacent areas of cropland. A few areas are idle or in woodland. The soils have poor potential for most uses because of seepage, flooding, or droughtiness. They have fair to good potential for wildlife habitat and nature areas. Capability subclass not assigned.

85—Udorthents, bouldery. This unit consists of well drained to excessively drained, gently sloping to steep, mostly stony and bouldery soils formed in colluvial material on mountain foot slopes, on benches, in coves, and along narrow drainageways. The material is washed or rolled from soils on higher mountain slopes that are underlain mostly by sandstone. Areas are rectangular or elongated and range from 2 to more than 80 acres. The areas are mostly in the Appalachian Mountains in the western part of the county. Slopes are mostly 2 to 45 percent.

Included with this unit in mapping are small areas of Monongahela, Buchanan, and Jefferson soils. Also included are small wet spots, sandstone rock outcrops, and areas of rubble. Included areas make up less than 5 percent of the mapped acreage of the unit.

Permeability is moderate to rapid in the soils of this unit. Available water capacity is low to moderate. Runoff is medium to rapid, and the soils receive seepage and overflow from the surrounding soils on mountain slopes.

Most of these soils are in woodland. A few small areas have been cleared and are used for low-quality pasture. These soils have poor potential for most uses. They have poor to fair potential for wildlife habitat and natural areas. Capability subclass not assigned.

86B—Unison fine sandy loam, 2 to 7 percent slopes. This gently sloping, well drained soil is on broad terraces along larger streams. Areas of this soil are commonly elongated or rectangular. A few small sinkholes are in some areas. The areas are 200 to more than 1,000 feet wide and range fom 5 to 50 acres.

Typically, the surface layer is yellowish brown fine sandy loam about 9 inches thick. The upper part of the subsoil is strong brown clay loam 8 inches thick. The lower part of the subsoil is mostly yellowish red clay 43 inches thick. The substratum is at a depth of 60 inches and is yellowish red and strong brown very gravelly clay loam.

Included with this soil in mapping are small, intermingled areas of Frederick, Allegheny, and Monongahela soils that make up about 10 to 15 percent of this unit. Also included are small areas of soils with a cobbly fine sandy loam surface layer that make up about 5 percent of the unit.

Permeability of this soil is moderate, and available water capacity is medium. Runoff is medium. Tilth is good. The soil is low in natural fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to medium acid unless lime has been applied. The hazard of erosion is moderate.

This soil has good potential for farming, and most of the acreage is farmed. The soil has good potential for many urban uses and for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay crops. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer is suitable for this soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is well suited to trees, and a moderate acreage is wooded. The soil is managed for pines and hardwoods.

This soil is limited for many urban purposes by moderate permeability and the moderate shrink-swell potential of the subsoil. Capability subclass IIe.

86C2—Unison fine sandy loam, 7 to 15 percent slopes, eroded. This sloping, well drained soil is on broad terraces along large streams. Areas of this soil are commonly elongated or rectangular. A few small sinkholes are

in some areas. Areas are 200 more than 800 feet wide and range from 5 to 40 acres.

Typically, the surface layer is yellowish brown fine sandy loam about 8 inches thick. The upper part of the subsoil is strong brown clay loam 9 inches thick. The lower part of the subsoil is mostly yellowish red clay 43 inches thick. The substratum is at a depth of 60 inches and is yellowish red and strong brown very gravelly clay loam.

Included with this soil in mapping are small, intermingled areas of Frederick, Allegheny, and Monongahela soils that make up about 10 to 15 percent of this unit. Also included are small areas of soils with a surface layer of cobbly fine sandy loam that make up about 5 percent of the unit.

Permeability of this soil is moderate, and available water capacity is medium. Runoff is medium to rapid. Tilth is good. The soil is low in natural fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to medium acid unless lime has been applied. The hazard of erosion is severe.

This soil has good potential for farming, and much of the acreage is farmed. The soil has fair potential for many urban uses and good potential for grasses and trees.

This soil is moderately well suited to cultivated crops and to pasture and hay. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer is suitable for this soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

The soil is well suited to trees, and a moderate acreage is wooded. The soil is managed for pines and hardwoods.

This soil is limited for many urban purposes mostly by slope, moderate permeability, and the moderate shrink-swell potential of the subsoil. Capability subclass IIIe.

86D2—Unison fine sandy loam, 15 to 25 percent slopes, eroded. This moderately steep, well drained soil is on terrace breaks between terrace levels along larger streams. Areas of this soil are commonly narrow and are elongated or rectangular. A few small sinkholes are in some areas, and areas have drainageways 100 to 300 feet apart. The areas of this unit are 150 to more than 500 feet wide and range from 5 to 30 acres.

Typically, the surface layer is yellowish brown fine sandy loam about 7 inches thick. The upper part of the subsoil is strong brown clay loam 10 inches thick. The lower part of the subsoil is mostly yellowish red clay 43 inches thick. The substratum is at a depth of 60 inches and is yellowish red and strong brown very gravelly clay loam.

Included with this soil in mapping are small, intermingled areas of Frederick and Allegheny soils that make up about 10 to 15 percent of this unit. Also included are small areas of severely eroded soils with a surface layer of cobbly clay loam that make up about 5 percent of the unit.

Permeability of this soil is moderate, and available water capacity is medium. Runoff is rapid. The soil is low in natural fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to medium acid unless lime has been applied. The hazard of erosion is severe.

This soil has poor to fair potential for row crops, and a moderate acreage is farmed. The soil has poor potential for many urban uses and good potential for grasses and trees.

This soil is poorly suited to cultivated crops and moderately well suited to pasture and hay. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer is suitable for this soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

The soil is well suited to trees, and a moderate acreage is wooded. The soil is managed for pines and hardwoods. The use of timber harvesting equipment is limited by slope.

This soil is limited for many urban uses by slope. Capability subclass IVe.

87B—Unison cobbly fine sandy loam, 2 to 7 percent slopes. This gently sloping, well drained soil is on broad terraces along larger streams. Areas of this soil are commonly elongated or rectangular. A few small sinkholes are in some areas, and areas have shallow drainageways 200 to 500 feet apart. The areas are 200 to more than 1,000 feet wide and range from 5 to 100 acres.

Typically, the surface layer is yellowish brown cobbly fine sandy loam about 9 inches thick. The upper part of the subsoil is strong brown clay loam 8 inches thick. The lower part of the subsoil is mostly yellowish red clay 43 inches thick. The substratum is at a depth of 60 inches and is yellowish red and strong brown very gravelly clay loam.

Included with this soil in mapping are small, intermingled areas of Frederick, Allegheny, and Monongahela soils that make up about 10 to 15 percent of this unit. Also included are small areas of severely eroded soils with a surface layer of cobbly clay loam that make up about 5 percent of the unit.

Permeability of this soil is moderate, and available water capacity is medium. Runoff is medium. The soil is low in natural fertility and organic matter content. The surface layer has cobblestones that interfere with tillage. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to medium acid unless lime has been applied. The hazard of erosion is moderate.

This soil has good potential for farming, and most of the acreage is farmed. The soil has good potential for some urban uses and for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay. Cobblestones in the surface layer damage tillage equipment and interfere with planting. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer is suitable for this soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is well suited to trees, and a moderate acreage is wooded. The soil is managed for pines and hardwoods.

This soil is limited for some urban purposes by moderate permeability and the moderate shrink-swell potential of the subsoil. Capability subclass IIe.

87C—Unison cobbly fine sandy loam, 7 to 15 percent slopes. This sloping, well drained soil is on broad terraces along larger streams. Areas of this soil are commonly elongated or rectangular. A few small sinkholes are in some areas, and areas have shallow drainageways 100 to 400 feet apart. The areas are 200 to more than 1,000 feet wide and range from 5 to 50 acres.

Typically, the surface layer is yellowish brown cobbly fine sandy loam about 8 inches thick. The upper part of the subsoil is strong brown clay loam 9 inches thick. The lower part of the subsoil is mostly yellowish red clay 43 inches thick. The substratum is at a depth of 60 inches and is yellowish red and strong brown very gravelly clay loam.

Included with this soil in mapping are small, intermingled areas of Frederick, Allegheny, and Monongahela soils that make up about 10 to 15 percent of this unit. Also included are small areas of severely eroded soils with a surface layer of cobbly clay loam that make up about 5 percent of the unit.

Permeability of this soil is moderate, and available water capacity is medium. Runoff is medium to rapid. The soil is low in natural fertility and organic matter content. Tilth is fair. The surface layer has cobblestones that interfere with tillage. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to medium acid unless lime has been applied. The hazard of erosion is severe.

This soil has good potential for farming, and much of the acreage is farmed. The soil has fair potential for some urban uses and good potential for grasses and trees.

This soil is moderately well suited to cultivated crops and to pasture and hay. Cobblestones in the surface layer damage tillage equipment and interfere with planting. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer is suitable for this soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

The soil is well suited to trees, and a moderate acreage is wooded. The soil is managed for pines and hardwoods.

This soil is limited for most urban purposes mainly by moderate permeability, the moderate shrink-swell potential of the subsoil, and slope. Capability subclass IIIe.

87E—Unison cobbly fine sandy loam, 15 to 45 percent slopes. This moderately steep to steep, well drained soil is on terrace breaks between terrace levels along larger streams. Areas of this soil are commonly narrow and are elongated or rectangular. A few small sinkholes are in some areas, and areas have drainageways 100 to 300 feet apart. The areas are 150 to more than 500 feet wide and range from 5 to 30 acres.

Typically, the surface layer is yellowish brown cobbly fine sandy loam about 7 inches thick. The upper part of the subsoil is strong brown clay loam 10 inches thick. The lower part of the subsoil is mostly yellowish red clay 43 inches thick. The substratum is at a depth of 60 inches and is yellowish red and strong brown very gravelly clay loam.

Included with this soil in mapping are small, intermingled areas of Frederick and Allegheny soils that make up about 10 percent of this unit. Also included are small areas of

severely eroded soils with a surface layer of cobbly clay loam that make up about 5 percent of the unit.

Permeability of this soil is moderate, and available water capacity is medium. Runoff is rapid. Tilth is fair. The soil is low in natural fertility and organic matter content. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of about 60 inches. The surface layer and subsoil are commonly strongly acid to medium acid unless lime has been applied. The hazard of erosion is severe.

This soil has poor to fair potential for farming, and a moderate acreage is farmed. The soil has poor potential for most urban uses and good potential for grasses and trees.

This soil is poorly suited to cultivated crops and moderately well suited to pasture and hay. Cobblestones in the surface layer damage tillage equipment and interfere with planting. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer is suitable for this soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

The soil is well suited to trees, and a moderate acreage is wooded. The soil is managed for pines and hardwoods. The use of logging equipment is limited by slope.

This soil is limited for most urban uses mainly by slope. Capability subclass IVe.

88—Urban land. This unit consists of soils that have been covered by streets, parking lots, shopping centers, industrial complexes, and other urban structures. The areas are mostly in towns and cities.

Most of the original soils underlying the areas of this unit have been altered by excavation or were covered by fill material in the process of leveling the area.

The exposed soil material is highly variable. In places it ranges from sandy loam to clay, depending on the type of soil worked. Outcrops of limestone, sandstone, or shale underlie some areas where the soil has been removed. Permeability is variable, and runoff in most areas is rapid to very rapid. Capability subclass not assigned.

89D3—Weikert very shaly silt loam, 7 to 25 percent slopes, severely eroded. This shallow, sloping to moderately steep, well drained soil is on the side slopes of hills and ridges. Slopes are rough and complex and are about 50 to 300 feet long. Many of the larger areas of this soil have shallow drainageways 50 to 100 feet apart. Areas of this soil are long and winding. They range from 3 to 30 acres or more.

Typically, the surface layer is yellowish brown very shaly silty loam about 5 inches thick. The subsoil is about 5 inches thick, and the substratum is about 3 inches thick. Both are yellowish brown very shaly silt loam. Acid shale is at a depth of 13 inches.

Included with this soil in mapping are small, intermingled areas of Berks and Sequoia soils that make up about 10 percent of this unit. Also included are small wet areas along drainageways and small areas of rock outcrop on side slopes and noses of ridges. These make up about 5 percent of the unit.

Permeability of this soil is moderately rapid, and available water capacity is very low. Runoff is rapid. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 13 to 16 inches. The surface layer and subsoil are commonly strongly acid or very strongly acid unless lime has been applied. Bedrock is at a depth of 1 to 1-1/2 feet. The hazard of erosion is severe.

This soil has very poor potential for farming, and a large acreage is in pasture. The soil has poor potential for most urban uses, poor potential for grasses, and fair potential for trees.

This soil is not suited to cultivated crops and is poorly suited to pasture. It is very droughty during the growing season. The hazard of erosion is a major limitation for farming. Increasing organic matter content, establishing and maintaining a mixture of grasses and legumes, and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This soil is suited to trees, and a large acreage is wooded. The soil is managed mostly for pines and hardwoods. The use of timber harvesting equipment is limited by slope.

This soil is limited for most urban uses by slope and shallow depth to bedrock. Capability subclass VIe.

89E3—Weikert very shaly silt loam, 25 to 45 percent slopes, severely eroded. This shallow, steep, well drained soil is on side slopes of hills and ridges. Slopes are rough and complex and are about 50 to 200 feet long. Many of the larger areas of this soil have shallow drainageways 50 to 100 feet apart. Areas of this soil are long and winding. They range from 3 to 50 acres or more.

Typically, the surface layer is yellowish brown very shaly silt loam about 5 inches thick. The subsoil is about 5 inches thick, and the substratum is about 3 inches thick. Both are yellowish brown very shaly silt loam. Acid shale is at a depth of 13 inches.

Included with this soil in mapping are small areas of Berks soils that make up about 10 percent of this unit.

Also included are small areas of rock outcrop that make up about 5 percent of the unit.

Permeability in this soil is moderately rapid, and available water capacity is very low. Runoff is rapid. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 13 to 16 inches. The surface layer and subsoil of this soil are commonly strongly acid or very strongly acid. Bedrock is at a depth of 1 to 1-1/2 feet. The hazard of erosion is severe.

This soil has poor potential for farming, and most of the acreage is in woodland. The soil has poor potential for most urban uses and for grasses and trees.

This soil is not suited to cultivated crops and is poorly suited to pasture. It is very droughty during the growing season. The hazard of erosion is a major limitation.

This soil is suited to trees, and a large acreage is wooded. The soil is managed mostly for pines. The use of timber harvesting equipment is limited by slope.

This soil is limited for practically all urban uses by steep slopes and shallow depth to bedrock. Capability subclass VIIe.

89F3—Weikert very shaly silt loam, 45 to 80 percent slopes, severely eroded. This shallow, very steep, well drained soil is on side slopes of hills and ridges. Slopes are rough and complex and are about 50 to 500 feet long. Many of the larger areas of this soil have shallow drainageways 50 to 200 feet apart. Areas of this soil are long and winding. They range from 5 to 300 acres or more.

Typically, the surface layer is yellowish brown very shaly silt loam about 4 inches thick. The subsoil is about 5 inches thick, and the substratum is about 3 inches thick. Both are yellowish brown very shaly silt loam. Acid shale is at a depth of 12 inches.

Included with this soil in mapping are small, intermingled areas of wet soils and extremely stony soils along the drainageways and small areas of rock outcrop along the tops, side slopes, and noses of ridges. Included areas make up about 10 percent of this unit.

Permeability of this soil is moderately rapid, and available water capacity is very low. Runoff is very rapid. The soil is low in natural fertility and organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 12 to 15 inches. The surface layer and subsoil of this soil are commonly strongly acid or very strongly acid. Bedrock is at a depth of 1 to 1-1/2 feet.

This soil has poor potential for farming, and most of the acreage is in woodland. The soil has poor potential for urban uses and for grasses and trees.

This soil is not suited to cultivated crops and is very poorly suited to pasture. The soil is very droughty during the growing season.

This soil is at best poorly suited to trees, but a large acreage is wooded. The soil is managed mostly for pines and hardwoods. The use of logging equipment is limited by slope.

This soil is limited for many urban uses by very steep slopes and depth to bedrock. Capability subclass VIIe.

90D2—Weikert-Berks shaly silt loams, 15 to 25 percent slopes, eroded. These moderately steep, well drained soils are so intermingled that it was not practical to map separately. The soils are on side slopes and noses of ridges. Slopes are rough and complex and are about 50 to 400 feet long. Many of the larger areas of this unit have shallow drainageways 50 to 100 feet apart. Areas of this unit are long and winding. They range from 5 to 75 acres or more. This unit is about 45 percent Weikert soils, 45 percent Berks soils, and 10 percent included soils.

Typically, the surface layer of the Weikert soils is yellowish brown shaly silt loam about 5 inches thick. The subsoil is about 7 inches thick, and the substratum is about 5 inches thick. Both are yellowish brown shaly silt loam. Acid shale is at a depth of 17 inches.

Typically, the surface layer of the Berks soils is dark brown and yellowish brown shaly silt loam about 10 inches thick. The subsoil is strong brown and yellowish brown shaly silt loam and very shaly loam about 17 inches thick. The substratum is yellowish brown very shaly silt loam 3 inches thick. Acid shale is at a depth of 30 inches.

Included with these soils in mapping are small, intermingled areas of Hazleton and Sequoia soils that make up about 5 percent of this unit. Also included are small wet areas and extremely stony areas along drainageways and small areas of rock outcrop along the tops, side slopes, and noses of ridges. These areas make up about 5 percent of the unit.

Permeability of the Weikert soils is moderately rapid and of the Berks soils is moderate. Available water capacity is low to very low. Runoff is rapid. These soils are low in natural fertility and organic matter content. The subsoil of both soils has a low shrink-swell potential. The root zone extends to a depth of about 15 to 18 inches in the Weikert soils and 25 to 30 inches in the Berks soils. The surface layer and subsoil of these soils are commonly strongly acid to very strongly acid unless lime has been applied. Bedrock is at a depth of 1 to 1-1/2 feet in the Weikert soils and 2 to 3-1/2 feet in the Berks soils. The hazard of erosion is severe.

This unit has poor potential for farming, and most of the acreage is in woodland. The unit has poor potential for many urban uses, poor potential for grasses, and fair potential for trees.

This unit is not suited to cultivated crops and is poorly suited to pasture. It is very droughty during the growing season. The hazard of erosion is a major limitation. Increasing organic matter content, establishing and maintaining a mixture of grasses and legumes, and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of

pasture management. If pastures are overgrazed, runoff and the hazard of erosion increase.

This unit is suited to trees, and a large acreage is wooded. The soils are managed mostly for pines and hardwoods. The use of timber harvesting equipment is limited by slope.

This unit is limited for urban uses by slope and depth to bedrock. Capability subclass VIe.

90E3—Weikert-Berks shaly silt loams, 25 to 50 percent slopes, severely eroded. These steep, well drained soils are so intermingled that it was not practical to map them separately. The soils are on side slopes of hills and ridges. Slopes are rough and complex and are about 50 to 500 feet long. Many of the larger areas of this unit have shallow drainageways 50 to 100 feet apart. Areas of this unit are long and winding. They range from 5 to 100 acres or more. This unit is about 50 percent Weikert soils, 40 percent Berks soils, and 10 percent included soils.

Typically, the surface layer of the Weikert soils is yellowish brown shaly silt loam about 5 inches thick. The subsoil is about 5 inches thick, and the substratum is about 5 inches thick. Both are yellowish brown shaly silt loam. Acid shale is at a depth of 15 inches.

Typically, the surface layer of the Berks soils is dark brown and yellowish brown shaly silt loam about 6 inches thick. The subsoil is strong brown and yellowish brown shaly silt loam about 17 inches thick. The substratum is yellowish brown very shaly silt loam 7 inches thick. Acid shale is at a depth of 30 inches.

Included with these soils in mapping are small areas of Hazleton soils that make up about 5 percent of this unit. Also included are small wet areas and extremely stony areas along drainageways and small areas of rock outcrop along the tops, side slopes, and noses of ridges. These make up about 5 percent of the unit.

Permeability of the Weikert soils is moderately rapid and of the Berks soil is moderate. Available water capacity is low to very low. Runoff is very rapid. These soils are low in natural fertility and organic matter content. The subsoil of both has a low shrink-swell potential. The root zone extends to a depth of about 15 inches in the Weikert soils and about 25 inches in the Berks soils. The surface layer and subsoil of these soils are commonly strongly acid or very strongly acid. Bedrock is at a depth of 1 to 1-1/2 feet in the Weikert soils and 2 to 3-1/2 feet in the Berks soils. The hazard of erosion is severe.

This unit has poor potential for farming, and most of the acreage is in woodland. The soils have poor potential for urban uses, poor potential for grasses, and fair potential for trees.

This unit is not suited to cultivated crops and is poorly suited to pasture. It is very droughty during the growing season. The hazard of erosion is a major limitation.

This unit is suited to trees, and a large acreage is wooded. The soils are managed mostly for pines and hardwoods. The use of timber harvesting equipment is limited by slope.

This unit is limited for urban uses by slope and depth to bedrock. Capability subclass VIIe.

91B—Wheeling silt loam, 0 to 7 percent slopes. This deep, nearly level to gently sloping, well drained soil is on broad low terraces adjacent to flood plains of the larger streams and rivers. Slopes are smooth and are about 200 to 800 feet wide. Areas of this soil are irregularly shaped. They range from 3 to 50 acres.

Typically, the surface layer is brown silt loam about 10 inches thick. The subsoil is yellowish brown and strong brown, friable heavy loam and light clay loam to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Allegheny and Chavies soils that make up about 10 percent of this unit. A few small gravelly areas and areas of soils containing a weak fragipan were also included. These make up 5 percent of the unit.

Permeability is moderate in this soil, and available water capacity is medium to high. Runoff is slow. Tilth is good. The soil is medium in natural fertility and moderate in organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. Unless lime has been applied, the surface layer is slightly acid to neutral and the subsoil is medium acid to neutral. The hazard of erosion is moderate. This soil is subject to flooding during periods of very heavy rainfall.

This soil has good potential for farming, and most of the acreage is farmed. The soil has poor potential for many urban uses and good potential for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay. Flooding is a hazard to farming operations. Controlling erosion and increasing organic matter content are management concerns. The use of lime and fertilizer is suitable for this soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of management.

The soil is suited to trees, but only a very small acreage is wooded. The soil is managed for hardwoods and pines.

This soil is limited for many urban purposes by flooding, moderate permeability, and moderate frost action potential. Capability subclass IIw.

91C2—Wheeling silt loam, 7 to 15 percent slopes, eroded. This deep, sloping, well drained soil is on broad low terraces adjacent to flood plains of the larger streams and rivers. Slopes are smooth and are about 200 to 800 feet wide. Areas of this soil are irregularly shaped. They range from 3 to 50 acres.

Typically, the surface layer is brown silt loam about 9 inches thick. The subsoil is yellowish brown and strong

brown, friable heavy loam and light clay loam to a depth of more than 60 inches.

Included with this soil in mapping are small areas of Allegheny soils that make up about 10 percent of this unit. A few small gravelly areas and areas of soils containing a weak fragipan are also included. These make up 5 percent of the unit.

Permeability is moderate in this soil, and available water capacity is medium. Runoff is medium. Tilth is good. The soil is medium in natural fertility and moderate in organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. Unless lime has been applied, the surface layer is slightly acid to neutral and the subsoil is medium acid to neutral. The hazard of erosion is severe. This soil is subject to flooding during periods of very heavy rainfall.

This soil has good potential for farming, and most of the acreage is farmed. The soil has poor potential for most urban uses and good potential for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay. Controlling flooding and erosion and maintaining organic matter content are management concerns. The use of lime and fertilizer is suitable for this soil. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management.

This soil is suited to trees, but only a very small acreage is wooded. The soil is managed for hardwoods and pines.

This soil is limited for most urban uses by flooding during abnormally high rainfall and by moderate permeability and moderate frost action potential. Capability subclass IIIe.

92B—Wheeling gravelly loam, 2 to 7 percent slopes. This deep, gently sloping, well drained soil is on slightly convex knolls and breaks between terraces. Slopes are smooth and are about 100 to 1,000 feet long. Areas of this soil are irregularly shaped. They range from 3 to 100 acres or more.

Typically, the surface layer is brown gravelly loam about 10 inches thick. The subsoil is yellowish brown and strong brown, friable heavy loam and light clay loam to a depth of more than 60 inches.

Included with this soil in mapping are small, intermingled areas of Allegheny and Chavies soils that make up about 10 percent of this unit. A few small nongravelly areas and areas of soils containing a weak fragipan are also included. These make up about 3 percent of the unit.

Permeability is moderate in this soil, and available water capacity is medium. Runoff is medium. Tilth is good. The soil is medium in natural fertility and moderate in organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. Unless lime has been applied, the surface layer is slightly acid to neutral and the subsoil is medium acid to neutral. This soil is subject to flooding during periods of heavy rainfall.

This soil has good potential for farming, and most of the acreage is farmed. The soil has poor potential for most urban uses and good potential for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay. Pebbles tend to interfere with tillage and planting operations. Controlling flooding and erosion and maintaining organic matter content are management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management.

The soil is suited to trees, but only a very small acreage is wooded. The soil is managed for hardwoods and pines.

This soil is limited for most urban uses by flooding during periods of abnormally high rainfall and by moderate permeability and moderate frost action potential. Capability subclass IIe.

92C2—Wheeling gravelly loam, 7 to 15 percent slopes, eroded. This deep, sloping, well drained soil is on knolls and breaks between terraces. Slopes are smooth and are about 100 to 400 feet long. Areas of this soil are irregularly shaped. They range from 3 to 25 acres or more.

Typically, the surface layer is brown gravelly loam about 10 inches thick. The subsoil is yellowish brown and strong brown, friable heavy loam and light clay loam to a depth of more than 60 inches.

Included with this soil in mapping are small areas of Allegheny soil that make up about 15 percent of this unit. A few small areas of soils containing a weak fragipan are also included. These make up 5 percent of the unit.

Permeability is moderate in this soil, and available water capacity is medium. Runoff is medium to rapid. Tilth is good. The soil is medium in natural fertility and moderate in organic matter content. The subsoil has a low shrink-swell potential. The root zone extends to a depth of about 60 inches. Unless lime has been applied, the surface layer is slightly acid to neutral and the subsoil is medium acid to neutral. The hazard of erosion is severe. This soil is subject to flooding during periods of very heavy rainfall.

This soil has good potential for farming, and most of the acreage is farmed. The soil has poor potential for most urban uses and good potential for grasses and trees.

This soil is suited to cultivated crops and to pasture and hay. Pebbles tend to interfere with tillage and planting operations. Controlling flooding and erosion and maintaining organic matter content are management concerns. The use of lime and fertilizer helps to offset acidity and increase fertility. If the soil is cultivated, minimum tillage, use of cover crops, and including grasses and legumes in the cropping system help to reduce runoff and control erosion. Crop residue should be kept on or near the surface.

Establishing and maintaining a mixture of grasses and legumes and proper grazing are major pasture management concerns. Use of proper stocking rates helps to maintain desirable grasses and legumes. Rotation of pastures, deferment of grazing, and the use of lime and fertilizer are suitable practices of pasture management.

The soil is suited to trees, but only a very small acreage is wooded. The soil is managed for hardwoods and pines.

This soil is limited for most urban purposes by flooding during periods of abnormally high rainfall and by moderate permeability and moderate frost action potential. Capability subclass IIIe.

Use and management of the soils

The soil survey is a detailed inventory and evaluation of the most basic resource of the survey area—the soil. It is useful in adjusting land use, including urbanization, to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in uses of the land.

While a soil survey is in progress, soil scientists, conservationists, engineers, and others keep extensive notes about the nature of the soils and about unique aspects of behavior of the soils. These notes include data on erosion, drought damage to specific crops, yield estimates, flooding, the functioning of septic tank disposal systems, and other factors affecting the productivity, potential, and limitations of the soils under various uses and management. In this way, field experience and measured data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section is useful in planning use and management of soils for crops and pasture; woodland; as sites for buildings, highways and other transportation systems, sanitary facilities, and parks and other recreation facilities; and for wildlife habitat. From the data presented, the potential of each soil for specified land uses can be determined, soil limitations to these land uses can be identified, and costly failures in houses and other structures, caused by unfavorable soil properties, can be avoided. A site where soil properties are favorable can be selected, or practices that will overcome the soil limitations can be planned.

Planners and others using the soil survey can evaluate the impact of specific land uses on the overall productivity of the survey area or other broad planning area and on the environment. Productivity and the environment are closely related to the nature of the soil. Plans should maintain or create a land-use pattern in harmony with the natural soil.

Contractors can find information that is useful in locating sources of sand and gravel, roadfill, and topsoil. Other information indicates the presence of bedrock, wetness, or very firm soil horizons that cause difficulty in excavation.

Health officials, highway officials, engineers, and many other specialists also can find useful information in this soil survey. The safe disposal of wastes, for example, is closely related to properties of the soil. Pavements, sidewalks, campsites, playgrounds, lawns, and trees and shrubs are influenced by the nature of the soil.

Crops and pasture

The major management concerns in the use of the soils for crops and pasture are described in this section. In addition, the crops or pasture plants best suited to the soil, including some not commonly grown in the survey area, are discussed; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are presented for each soil.

This section provides information about the overall agricultural potential of the survey area and about the management practices that are needed. The information is useful to equipment dealers, land improvement contractors, fertilizer companies, processing companies, planners, conservationists, and others. For each kind of soil, information about management is presented in the section "Soil maps for detailed planning." Planners of management systems for individual fields or farms should also consider the detailed information given in the description of each soil.

The number of farms in Augusta County has decreased since 1965; however, the size of the individual farm and the total acreage in farms have increased.

No particular crop or type of livestock is the one major source of income in the county, but major sources include sheep, cattle, hogs, poultry, dairy, and fruit. Field crops suited to the soils and climate of the county include corn, wheat, hay, and, to a lesser extent, rye, barley, and oats.

Special crops grown commercially in the county are vegetables, small fruits, tree fruits, and nursery plants. A very small acreage is used for strawberries, melons, sweet corn, and other vegetables. Apples and peaches are the major tree fruits.

Controlling erosion is the major concern on about 60 percent of the cropland and pasture in Augusta County. If the slope is more than 2 percent, erosion is a hazard.

Loss of the surface layer through erosion is damaging for two reasons. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated

into the plow layer. Second, soil erosion on farmland results in sediment entering streams.

Loss of the surface layer is especially damaging on soils with a clayey subsoil, such as the Christian, Edom, Endcav, Frederick, and Unison soils. It is also damaging on soils with a layer in or below the subsoil that limits the depth of the root zone or on soils with a shallow depth to bedrock. Buchanan and Monongahela soils, for example, have limiting layers, and Chilhowie, Lehew, and Weikert soils are shallow to bedrock.

Control of erosion minimizes the pollution of streams by sediment. Controlling sediment improves the quality of water for municipal use, for recreation, and for fish and wildlife.

On many sloping fields, preparing a good seedbed and tilling are difficult on clayey spots because the original friable surface layer is eroded. Such spots are common in areas of moderately eroded Christian, Edom, Endcav, Frederick, and Unison soils.

Erosion-control practices provide a protective surface cover, reduce runoff, and increase infiltration. A cropping system that keeps vegetative cover on the soil for extended periods can hold soil erosion losses to amounts that will not reduce the productive capacity of the soils. On livestock farms which require pasture and hay, the legume and grass forage crops in the cropping system reduce erosion on sloping land, provide nitrogen, and improve tilth.

Minimizing tillage and leaving crop residues on the surface help to increase infiltration and reduce the hazards of runoff and erosion. These practices can be used on most soils in the survey area, but are more difficult to use successfully on the eroded and severely eroded soils. No-till farming for corn is effective in reducing erosion on sloping land and can be used on most soils in the survey area. No-till farming is more difficult to practice successfully, however, on the soils with a clayey surface layer.

Contouring and contour stripcropping are erosion-control practices used in the survey area. They are suited to soils with smooth, uniform slopes, including most areas of sloping Allegheny, Bookwood, Burketown, Christian, Cotaco, Edom, Endcav, Frederick, Jefferson, Sequoia, Shenval, Unison, and Wheeling soils.

Providing drainage is the major management need on about 17 percent of the acreage used for crops and pasture in the survey area. Some soils are so wet that the production of crops common to the area is generally not feasible. These are poorly drained Aqualfs, Aquents, Atkins, Fluvaquents, and Purdy soils, all of which make up about 10,426 acres in the survey area.

Unless drained, the somewhat poorly drained soils are so wet that crops are damaged during most years. In this category are the Buchanan soils, which make up about 3,263 acres.

The design of surface and subsurface drainage systems varies with the kind of soil. A combination of surface drainage and tile drainage is needed in most areas of the poorly drained soils that are intensively used for row crops. Drains must be more closely spaced in soils with slow permeability than in the more permeable soils. Tile drainage is very slow in Aqualfs and Purdy soils. Finding adequate outlets for tile drainage systems is difficult in many areas of Atkins, Fluvaquents, and Purdy soils.

Information on erosion-control practices and drainage design for each kind of soil is available at local offices of the Soil Conservation Service.

Yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. Absence of an estimated yield indicates that the crop is not suited to or not commonly grown on the soil or that a given crop is not commonly irrigated.

The estimated yields were based mainly on the experience and records of farmers, conservationists, and extension agents. Results of field trials and demonstrations and available yield data from nearby counties were also considered.

The yields were estimated assuming that the latest soil and crop management practices were used. Hay and pasture yields were estimated for the most productive varieties of grasses and legumes suited to the climate and the soil. A few farmers may be obtaining average yields higher than those shown in table 5.

The management needed to achieve the indicated yields of the various crops depends on the kind of soil and the crop. Such management provides drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate tillage practices, including time of tillage and seedbed preparation and tilling when soil moisture is favorable; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residues, barnyard manure, and green-manure crops; harvesting crops with the smallest possible loss; and timeliness of all fieldwork.

The estimated yields reflect the productive capacity of the soils for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not included because the acreage of these crops is small. The local offices of the Soil Conservation Service and the Cooperative Extension Service can provide information about the management concerns and productivity of the soils for these crops.

Capability classes and subclasses

Capability classes and subclasses show, in a general way, the suitability of soils for most kinds of field crops. The soils are classed according to their limitations when they are used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops that require special management (*4*). Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forest trees, or for engineering purposes.

In the capability system, all kinds of soil are grouped at three levels: capability class, subclass, and unit. These levels are defined in the following paragraphs. A survey area may not have soils of all classes.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and landforms have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class; they are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The capability class or subclass is identified in the description of each soil map unit in the section "Soil maps for detailed planning."

Engineering

Charles McDowell, assistant state conservation engineer, Soil Conservation Service, reviewed this section.

This section provides information about the use of soils for building sites, sanitary facilities, construction material, and water management. Among those who can benefit from this information are engineers, landowners, community planners, town and city managers, land developers, builders, contractors, and farmers and ranchers.

The ratings in the engineering tables are based on test data and estimated data in the "Soil properties" section. The ratings were determined jointly by soil scientists and engineers of the Soil Conservation Service using known relationships between the soil properties and the behavior of soils in various engineering uses (*5*).

Among the soil properties and site conditions identified by a soil survey and used in determining the ratings in this section were grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock that is within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure or aggregation, in-place soil density, and geologic origin of the soil material. Where pertinent, data about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of absorbed cations were also considered.

On the basis of information assembled about soil properties, ranges of values can be estimated for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, shear strength, compressibility, slope stability, and other factors of expected soil behavior in engineering uses. As appropriate, these values can be applied to each major horizon of each soil or to the entire profile.

These factors of soil behavior affect construction and maintenance of roads, airport runways, pipelines, foundations for small buildings, ponds and small dams, irrigation projects, drainage systems, sewage and refuse disposal systems, and other engineering works. The ranges of values can be used to (1) select potential residential, commercial, industrial, and recreational uses; (2) make preliminary estimates pertinent to construction in a particular area; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for location of sanitary landfills, onsite sewage disposal systems, and other waste disposal facilities; (5) plan detailed onsite investigations of soils and geology; (6) find sources of gravel, sand, clay, and topsoil; (7) plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; (8) relate performance of structures already built to

the properties of the kinds of soil on which they are built so that performance of similar structures on the same or a similar soil in other locations can be predicted; and (9) predict the trafficability of soils for cross-country movement of vehicles and construction equipment.

Data presented in this section are useful for land-use planning and for choosing alternative practices or general designs that will overcome unfavorable soil properties and minimize soil-related failures. Limitations to the use of these data, however, should be well understood. First, the data are generally not presented for soil material below a depth of 5 or 6 feet. Also, because of the scale of the detailed map in this soil survey, small areas of soils that differ from the dominant soil may be included in mapping. Thus, these data do not eliminate the need for onsite investigations, testing, and analysis by personnel having expertise in the specific use contemplated.

The information is presented mainly in tables. Table 6 shows, for each kind of soil, the degree and kind of limitations for building site development; table 7, for sanitary facilities; and table 9, for water management. Table 8 shows the suitability of each kind of soil as a source of construction materials.

The information in the tables, along with the soil map, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations and to construct interpretive maps for specific uses of land.

Some of the terms used in this soil survey have a special meaning in soil science. Many of these terms are defined in the Glossary.

Building site development

The degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, and local roads and streets are indicated in table 6. A *slight* limitation indicates that soil properties generally are favorable for the specified use; any limitation is minor and easily overcome. A *moderate* limitation indicates that soil properties and site features are unfavorable for the specified use, but the limitations can be overcome or minimized by special planning and design. A *severe* limitation indicates that one or more soil properties or site features are so unfavorable or difficult to overcome that a major increase in construction effort, special design, or intensive maintenance is required. For some soils rated severe, such costly measures may not be feasible.

Shallow excavations are made for pipelines, sewerlines, communications and power transmission lines, basements, open ditches, and cemeteries. Such digging or trenching is influenced by soil wetness caused by a seasonal high water table; the texture and consistence of soils; the tendency of soils to cave in or slough; and the presence of very firm, dense soil layers, bedrock, or large stones. In addition, excavations are affected by slope of the soil and the probability of flooding. Ratings do not apply to soil horizons below a depth of 6 feet unless otherwise noted.

In the soil series descriptions, the consistence of each soil horizon is given, and the presence of very firm or extremely firm layers, usually difficult to excavate, is indicated.

Dwellings and *small commercial buildings* referred to in table 6 are built on undisturbed soil and have foundation loads of a dwelling no more than three stories high. Separate ratings are made for small commercial buildings without basements and for dwellings with and without basements. For such structures, soils should be sufficiently stable that cracking or subsidence of the structure from settling or shear failure of the foundation does not occur. These ratings were determined from estimates of the shear strength, compressibility, and shrink-swell potential of the soil. Soil texture, plasticity and in-place density, potential frost action, soil wetness, and depth to a seasonal high water table were also considered. Soil wetness and depth to a seasonal high water table indicate potential difficulty in providing adequate drainage for basements, lawns, and gardens. Depth to bedrock, slope, and large stones in or on the soil are also important considerations in the choice of sites for these structures and were considered in determining the ratings. Susceptibility to flooding is a serious hazard.

Local roads and streets referred to in table 6 have an all-weather surface that can carry light to medium traffic all year. They consist of a subgrade of the underlying soil material; a base of gravel, crushed rock fragments, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. The roads are graded with soil material at hand, and most cuts and fills are less than 6 feet deep.

The load supporting capacity and the stability of the soil as well as the quantity and workability of fill material available are important in design and construction of roads and streets. The classifications of the soil and the soil texture, density, shrink-swell potential, and potential frost action are indicators of the traffic supporting capacity used in making the ratings. Soil wetness, flooding, slope, depth to hard rock or very compact layers, and content of large stones affect stability and ease of excavation.

Lawns and landscaping require soils that are suitable for the establishment and maintenance of turf for lawns and ornamental trees and shrubs for landscaping. The best soils are firm after rains, are not dusty when dry, and absorb water readily and hold sufficient moisture for plant growth. The surface layer should be free of stones. If shaping is required, the soils should be thick enough over bedrock or hardpan to allow for necessary grading. In rating the soils, the availability of water for sprinkling is assumed.

Sanitary facilities

Favorable soil properties and site features are needed for proper functioning of septic tank absorption fields,

sewage lagoons, and sanitary landfills. The nature of the soil is important in selecting sites for these facilities and in identifying limiting soil properties and site features to be considered in design and installation. Also, those soil properties that affect ease of excavation or installation of these facilities will be of interest to contractors and local officials. Table 7 shows the degree and kind of limitations of each soil for such uses and for use of the soil as daily cover for landfills. It is important to observe local ordinances and regulations.

If the degree of soil limitation is expressed as *slight*, soils are generally favorable for the specified use and limitations are minor and easily overcome; if *moderate*, soil properties or site features are unfavorable for the specified use, but limitations can be overcome by special planning and design; and if *severe*, soil properties or site features are so unfavorable or difficult to overcome that major soil reclamation, special designs, or intensive maintenance is required. Soil suitability is rated by the terms *good*, *fair*, or *poor*, which, respectively, mean about the same as the terms *slight*, *moderate*, and *severe*.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into the natural soil. Only the soil layers between depths of 18 and 72 inches are evaluated for this use. The soil properties and site features considered are those that affect the absorption of the effluent and those that affect the construction of the system.

Properties and features that affect absorption of the effluent are permeability, depth to seasonal high water table, depth to bedrock, and susceptibility to flooding. Stones, boulders, and shallowness to bedrock interfere with installation. Excessive slope can cause lateral seepage and surfacing of the effluent. Also, soil erosion and soil slippage are hazards if absorption fields are installed on sloping soils.

In some soils, loose sand and gravel or fractured bedrock is less than 4 feet below the tile lines. In these soils the absorption field does not adequately filter the effluent, and ground water in the area may be contaminated.

On many of the soils that have moderate or severe limitations for use as septic tank absorption fields, a system to lower the seasonal water table can be installed or the size of the absorption field can be increased so that performance is satisfactory.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons have a nearly level floor and cut slopes or embankments of compacted soil material. Aerobic lagoons generally are designed to hold sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Soils that are very high in content of organic matter and those that have cobbles, stones, or boulders are not suitable. Unless the soil has very slow permeability, contamination of ground water is a hazard where the seasonal high water table is above the level of the lagoon floor. In soils where the water table is seasonally high, seepage of ground water into the lagoon can seriously reduce the lagoon's capacity for liquid waste. Slope, depth to bedrock, and susceptibility to flooding also affect the suitability of sites for sewage lagoons or the cost of construction. Shear strength and permeability of compacted soil material affect the performance of embankments.

Sanitary landfill is a method of disposing of solid waste by placing refuse in successive layers either in excavated trenches or on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil material. Landfill areas are subject to heavy vehicular traffic. Risk of polluting ground water and trafficability affect the suitability of a soil for this use. The best soils have a loamy or silty texture, have moderate to slow permeability, are deep to a seasonal water table, and are not subject to flooding. Clayey soils are likely to be sticky and difficult to spread. Sandy or gravelly soils generally have rapid permeability, which might allow noxious liquids to contaminate ground water. Soil wetness can be a limitation, because operating heavy equipment on a wet soil is difficult. Seepage into the refuse increases the risk of pollution of ground water.

Ease of excavation affects the suitability of a soil for the trench type of landfill. A suitable soil is deep to bedrock and free of large stones and boulders. If the seasonal water table is high, water will seep into trenches.

Unless otherwise stated, the limitations in table 7 apply only to the soil material within a depth of about 6 feet. If the trench is deeper, a limitation of slight or moderate may not be valid. Site investigation is needed before a site is selected.

Daily cover for landfill should be soil that is easy to excavate and spread over the compacted fill in wet and dry periods. Soils that are loamy or silty and free of stones or boulders are better than other soils. Clayey soils may be sticky and difficult to spread; sandy soils may be subject to soil blowing.

The soils selected for final cover of landfills should be suitable for growing plants. Of all the horizons, the A horizon in most soils has the best workability, more organic matter, and the best potential for growing plants. Thus, for either the area- or trench-type landfill, stockpiling material from the A horizon for use as the surface layer of the final cover is desirable.

Where it is necessary to bring in soil material for daily or final cover, thickness of suitable soil material available and depth to a seasonal high water table in soils surrounding the sites should be evaluated. Other factors to be evaluated are those that affect reclamation of the borrow areas. These factors include slope, erodibility, and potential for plant growth.

Construction materials

The suitability of each soil as a source of roadfill, sand, gravel, and topsoil is indicated in table 8 by ratings of

good, fair, or poor. The texture, thickness, and organic-matter content of each soil horizon are important factors in rating soils for use as construction materials. Each soil is evaluated to the depth observed, generally about 6 feet.

Roadfill is soil material used in embankments for roads. Soils are evaluated as a source of roadfill for low embankments, which generally are less than 6 feet high and less exacting in design than high embankments. The ratings reflect the ease of excavating and working the material and the expected performance of the material where it has been compacted and adequately drained. The performance of soil after it is stabilized with lime or cement is not considered in the ratings, but information about some of the soil properties that influence such performance is given in the descriptions of the soil series.

The ratings apply to the soil material between the surface and a depth of 5 to 6 feet. It is assumed that soil horizons will be mixed during excavation and spreading. Many soils have horizons of contrasting suitability within their profile. The estimated engineering properties in table 13 provide specific information about the nature of each horizon. This information can help determine the suitability of each horizon for roadfill.

Soils rated *good* are coarse grained. They have low shrink-swell potential, low potential frost action, and few cobbles and stones. They are at least moderately well drained and have slopes of 15 percent or less. Soils rated *fair* have a plasticity index of less than 15 and have other limiting features, such as moderate shrink-swell potential, moderately steep slopes, wetness, or many stones. If the thickness of suitable material is less than 3 feet, the entire soil is rated *poor*.

Sand and *gravel* are used in great quantities in many kinds of construction. The ratings in table 8 provide guidance as to where to look for probable sources and are based on the probability that soils in a given area contain sizable quantities of sand or gravel. A soil rated *good* or *fair* has a layer of suitable material at least 3 feet thick, the top of which is within a depth of 6 feet. Coarse fragments of soft bedrock material, such as shale and siltstone, are not considered to be sand and gravel. Fine-grained soils are not suitable sources of sand and gravel.

The ratings do not take into account depth to the water table or other factors that affect excavation of the material. Descriptions of grain size, kinds of minerals, reaction, and stratification are given in the soil series descriptions and in table 13.

Topsoil is used in areas where vegetation is to be established and maintained. Suitability is affected mainly by the ease of working and spreading the soil material in preparing a seedbed and by the ability of the soil material to support plantlife. Also considered is the damage that can result at the area from which the topsoil is taken.

The ease of excavation is influenced by the thickness of suitable material, wetness, slope, and amount of stones. The ability of the soil to support plantlife is determined by texture, structure, and the amount of soluble salts or toxic substances. Organic matter in the A1 or Ap horizon greatly increases the absorption and retention of moisture and nutrients. Therefore, the soil material from these horizons should be carefully preserved for later use.

Soils rated *good* have at least 16 inches of friable loamy material at their surface. They are free of stones and cobbles, are low in content of gravel, and have gentle slopes. They are low in soluble salts that can limit or prevent plant growth. They are naturally fertile or respond well to fertilizer. They are not so wet that excavation is difficult during most of the year.

Soils rated *fair* are loose sandy soils or firm loamy or clayey soils in which the suitable material is only 8 to 16 inches thick or soils that have appreciable amounts of gravel, stones, or soluble salt.

Soils rated *poor* are very sandy soils and very firm clayey soils; soils with suitable layers less than 8 inches thick; soils having large amounts of gravel, stones, or soluble salt; steep soils; and poorly drained soils.

Although a rating of *good* is not based entirely on high content of organic matter, a surface horizon is generally preferred for topsoil because of its organic-matter content. This horizon is designated as A1 or Ap in the soil series descriptions. The absorption and retention of moisture and nutrients for plant growth are greatly increased by organic matter.

Water management

Many soil properties and site features that affect water management practices have been identified in this soil survey. In table 9 the degree of soil limitation and soil and site features that affect use are indicated for each kind of soil. This information is significant in planning, installing, and maintaining water control structures.

Soil and site limitations are expressed as slight, moderate, and severe. *Slight* means that the soil properties and site features are generally favorable for the specified use and that any limitation is minor and easily overcome. *Moderate* means that some soil properties or site features are unfavorable for the specified use but can be overcome or modified by special planning and design. *Severe* means that the soil properties and site features are so unfavorable and so difficult to correct or overcome that major soil reclamation, special design, or intensive maintenance is required.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have a low seepage potential, which is determined by permeability and the depth to fractured or permeable bedrock or other permeable material.

Embankments, dikes, and levees require soil material that is resistant to seepage, erosion, and piping and has favorable stability, shrink-swell potential, shear strength, and compaction characteristics. Large stones and organic matter in a soil downgrade the suitability of a soil for use in embankments, dikes, and levees.

Drainage of soil is affected by such soil properties as permeability; texture; depth to bedrock, hardpan, or other layers that affect the rate of water movement; depth to the water table; slope; stability of ditchbanks; susceptibility to flooding; salinity and alkalinity; and availability of outlets for drainage.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to intercept runoff. They allow water to soak into the soil or flow slowly to an outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock, hardpan, or other unfavorable material; large stones; permeability; ease of establishing vegetation; and resistance to water erosion, soil blowing, soil slipping, and piping.

Grassed waterways are constructed to channel runoff to outlets at a nonerosive velocity. Features that affect the use of soils for waterways are slope, permeability, erodibility, wetness, and suitability for permanent vegetation.

Woodland management and productivity

Table 10 contains information useful to woodland owners or forest managers planning use of soils for wood crops. Map unit symbols for soils suitable for wood crops are listed, and the ordination (woodland suitability) symbol for each soil is given. All soils bearing the same ordination symbol require the same general kinds of woodland management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates insignificant limitations or restrictions. If a soil has more than one limitation, priority in placing the soil into a limitation class is in the following order: x, w, d, c, s, f, and r.

In table 10 the soils are also rated for a number of factors to be considered in management. *Slight, moderate,* and *severe* are used to indicate the degree of major soil limitations.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if some measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or equipment; *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree that the soil affects expected mortality of planted tree seedlings. Plant competition is not considered in the ratings. Seedlings from good planting stock that are properly planted during a period of sufficient rainfall are rated. A rating of *slight* indicates that the expected mortality of the planted seedlings is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Considered in the ratings of *windthrow hazard* are characteristics of the soil that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that trees in wooded areas are not expected to be blown down by commonly occurring winds; *moderate*, that some trees are blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in 50 years. The site index applies to fully stocked, even-aged, unmanaged stands. Common trees mainly consist of those that woodland managers generally favor on the basis of growth rate, quality, value, and marketability. Also listed are trees that commonly grow on this soil, and the growth rate and value of such trees are not considered.

Trees to plant are those that are suitable for commercial wood production and that are suited to the soils.

Recreation

The soils of the survey area are rated in table 11 according to limitations that affect their suitability for recreation uses. The ratings are based on such restrictive soil features as flooding, wetness, slope, and texture of the surface layer. Not considered in these ratings, but important in evaluating a site, are location and accessibility of the area, size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, potential water impoundment sites available, and either access to public sewerlines or capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited, in varying degree, for recreation use by the duration and intensity of flooding and the season when flooding occurs. Onsite assessment of height, duration, intensity, and frequency of flooding is essential in planning recreation facilities.

The degree of the limitation of the soils is expressed as slight, moderate, or severe. *Slight* means that the soil properties are generally favorable and that the limitations are minor and easily overcome. *Moderate* means that the

limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 11 can be supplemented by information in other parts of this survey. Especially helpful are interpretations for septic tank absorption fields, given in table 7, and interpretations for dwellings without basements and for local roads and streets, given in table 6.

Camp areas require such site preparation as shaping and leveling for tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils for this use have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing camping sites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for use as picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that will increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones or boulders, is firm after rains, and is not dusty when dry. If shaping is required to obtain a uniform grade, the depth of the soil over bedrock or hardpan should be enough to allow necessary grading.

Paths and trails for walking, horseback riding, bicycling, and other uses should require little or no cutting and filling. The best soils for this use are those that are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once during the annual period of use. They should have moderate slopes and have few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They should have a surface that is free of stones and boulders and have moderate slopes. Suitability of the soil for traps, tees, or greens was not considered in rating the soils. Irrigation is an assumed management practice.

Wildlife habitat

R. F. Dugan, biologist, Soil Conservation Service, assisted in preparing this section.

Augusta County has no large lakes or rivers, and thus most of the wildlife in the county inhabit open areas or woodland. However, water-oriented furbearers such as mink, beaver, and muskrat are in the county, and some ducks and geese inhabit the larger streams, reservoirs, and farm ponds during migration.

Quails, rabbits, and woodchucks inhabit wooded and open areas but are common in pastures, hayfields, and abandoned fields and along fencerows. These types of wildlife and the gray squirrels and fox squirrels are the most common small game in the county. The gray squirrels are in areas throughout the county, and the fox squirrels inhabit tree-dotted pastures and the edges of woodlots.

Some of the common types of wildlife in the mountains and woodlands are white-tailed deer, black bear, wild turkey, and ruffed grouse. Pileated woodpeckers and red-headed woodpeckers are in the larger wooded areas and glades.

Most of the mountain streams are stocked with rainbow, brown, and brook trout. Bass, sunfish, catfish, pickerel, and carp are common in the rivers and valley streams.

Soils directly affect the kind and amount of vegetation that is available to wildlife as food and cover, and they affect the construction of water impoundments. The kind and abundance of wildlife that populate an area depend largely on the amount and distribution of food, cover, and water. If any one of these elements is missing, is inadequate, or is inaccessible, wildlife either are scarce or do not inhabit the area.

If the soils have the potential, wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by helping the natural establishment of desirable plants.

In table 12, the soils in the survey area are rated according to their potential to support the main kinds of wildlife habitat in the area. This information can be used in planning for parks, wildlife refuges, nature study areas, and other developments for wildlife; selecting areas that are suitable for wildlife; selecting soils that are suitable for creating, improving, or maintaining specific elements of wildlife habitat; and determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* means that the element of wildlife habitat or the kind of habitat is easily created, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected if the soil is used for the designated purpose. A rating of *fair* means that the element of wildlife habitat or kind of habitat can be created, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* means that limitations are severe for the

designated element or kind of wildlife habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* means that restrictions for the element of wildlife habitat or kind of wildlife are very severe, and that unsatisfactory results can be expected. Wildlife habitat is impractical or even impossible to create, improve, or maintain on soils having such a rating.

The elements of wildlife habitat are briefly described in the following paragraphs.

Grain and seed crops are seed-producing annuals used by wildlife. The major soil properties that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, millet, and sorghum.

Grasses and legumes are domestic perennial grasses and herbaceous legumes that are planted for wildlife food and cover. Major soil properties that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, timothy, orchardgrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds, that provide food and cover for wildlife. Major soil properties that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are broom sedge, goldenrod, beggarweed, ragweed, and wild strawberry.

Hardwood trees and the associated woody understory provide cover for wildlife and produce nuts or other fruit, buds, catkins, twigs, bark, or foliage that wildlife eat. Major soil properties that affect growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of native plants are oak, cherry, beech, apple, hawthorn, dogwood, hickory, plum, and honeysuckle. Examples of fruit-producing shrubs that are commercially available and suitable for planting on soils rated *good* are autumn-olive and crabapple.

Coniferous plants are cone-bearing trees, shrubs, or ground cover plants that furnish habitat or supply food in the form of browse, seeds, or fruitlike cones. Soil properties that have a major effect on the growth of coniferous plants are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, cedar, and hemlock.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites, exclusive of submerged or floating aquatics. They produce food or cover for wildlife that use wetland as habitat. Major soil properties affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, rushes, sedges, reeds, and barnyard grass.

Shallow water areas are bodies of water that have an average depth of less than 5 feet and that are useful to wildlife. They can be naturally wet areas, or they can be created by dams or levees or by water-control structures in marshes or streams. Major soil properties affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. The availability of a dependable water supply is important if water areas are to be developed. Examples of shallow water areas are marshes, swamps, and beaver ponds.

The kinds of wildlife habitat are briefly described in the following paragraphs.

Openland habitat consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants.

Woodland habitat consists of areas of hardwoods or conifers, or a mixture of both, and associated grasses, legumes, and wild herbaceous plants.

Wetland habitat consists of open, marshy or swampy, shallow water areas where water-tolerant plants grow.

Soil properties

Charles McDowell, assistant state conservation engineer, Soil Conservation Service, helped to prepare this section.

Extensive data about soil properties are summarized on the following pages. The two main sources of these data are the many soil borings made during the course of the survey and the laboratory analyses of selected soil samples from typical profiles. The laboratory data for selected soil samples in Augusta County are on file and available at the Virginia Polytechnic Institute and State University, Blacksburg, Virginia, and the State office of the Soil Conservation Service, Richmond, Virginia.

In making soil borings during field mapping, soil scientists can identify several important soil properties. They note the seasonal soil moisture condition or the presence of free water and its depth. For each horizon in the profile, they note the thickness and color of the soil material; the texture, or amount of clay, silt, sand, and gravel or other coarse fragments; the structure, or the natural pattern of cracks and pores in the undisturbed soil; and the consistence of the soil material in place under the existing soil moisture conditions. They record the depth of plant roots, determine the pH or reaction of the soil, and identify any free carbonates.

Samples of soil material are analyzed in the laboratory to verify the field estimates of soil properties and to determine all major properties of key soils, especially properties that cannot be estimated accurately by field observation. Laboratory analyses are not conducted for all soil series

in the survey area, but laboratory data for many soil series not tested are available from nearby survey areas.

The available field and laboratory data are summarized in tables. The tables give the estimated range of engineering properties, the engineering classifications, and the physical and chemical properties of each major horizon of each soil in the survey area. They also present data about pertinent soil and water features.

Engineering properties

Table 13 gives estimates of engineering properties and classifications for the major horizons of each soil in the survey area.

Most soils have, within the upper 5 or 6 feet, horizons of contrasting properties. Table 13 gives information for each of these contrasting horizons in a typical profile. *Depth* to the upper and lower boundaries of each horizon is indicated. More information about the range in depth and about other properties in each horizon is given for each soil series in the section "Soil series and morphology."

Texture is described in table 13 in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains gravel or other particles coarser than sand, an appropriate modifier is added, for example, "gravelly loam." Other texture terms are defined in the Glossary.

The two systems commonly used in classifying soils for engineering use are the Unified soil classification system (Unified) (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO) (*1*).

The *Unified* system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter, plasticity index, liquid limit, and organic-matter content. Soils are grouped into 15 classes—eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes have a dual classification symbol, for example, CL-ML.

The *AASHTO* system classifies soils according to those properties that affect their use in highway construction and maintenance. In this system a mineral soil is classified in one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines. At the other extreme, in group A-7, are fine-grained soils. Highly organic soils are classified in group A-8 on the basis of visual inspection.

When laboratory data are available, the A-1, A-2, and A-7 groups are further classified as follows: A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, and A-7-6. As an additional refinement, the desirability of soils as subgrade material can be indicated by a group index number. These numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The estimated classification, without group index numbers, is given in table 13. Also in table 13 the percentage, by weight, of rock fragments more than 3 inches in diameter is estimated for each major horizon. These estimates are determined mainly by observing volume percentage in the field and then converting that, by formula, to weight percentage.

Percentage of the soil material less than 3 inches in diameter that passes each of four sieves (U.S. standard) is estimated for each major horizon. The estimates are based on tests of soils that were sampled in the survey area and in nearby areas and on field estimates from many borings made during the survey.

Liquid limit and *plasticity index* indicate the effect of water on the strength and consistence of soil. These indexes are used in both the Unified and AASHTO soil classification systems. They are also used as indicators in making general predictions of soil behavior. Range in liquid limit and plasticity index is estimated on the basis of test data from the survey area or from nearby areas and on observations of the many soil borings made during the survey.

In some surveys, the estimates are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterburg limits extend a marginal amount across classification boundaries (1 or 2 percent), the classification in the marginal zone is omitted.

Physical and chemical properties

Table 14 shows estimated values for several soil characteristics and features that affect behavior of soils in engineering uses. These estimates are given for each major horizon, at the depths indicated, in the typical pedon of each soil. The estimates are based on field observations and on test data for these and similar soils.

Permeability is estimated on the basis of known relationships among the soil characteristics observed in the field—particularly soil structure, porosity, and gradation or texture—that influence the downward movement of water in the soil. The estimates are for vertical water movement when the soil is saturated. Not considered in the estimates is lateral seepage or such transient soil features as plowpans and surface crusts. Permeability of the soil is an important factor to be considered in planning and designing drainage systems, in evaluating the potential of soils for septic tank systems and other waste disposal systems, and in many other aspects of land use and management.

Available water capacity is rated on the basis of soil characteristics that influence the ability of the soil to hold water and make it available to plants. Important characteristics are content of organic matter, soil texture, and soil structure. Shallow-rooted plants are not likely to use the available water from the deeper soil horizons. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design of irrigation systems.

Soil reaction is expressed as a range in pH values. The range in pH of each major horizon is based on many field checks. For many soils, the values have been verified by laboratory analyses. Soil reaction is important in selecting the crops, ornamental plants, or other plants to be grown; in evaluating soil amendments for fertility and stabilization; and in evaluating the corrosivity of soils.

Shrink-swell potential depends mainly on the amount and kind of clay in the soil. Laboratory measurements of the swelling of undisturbed clods were made for many soils. For others the swelling was estimated on the basis of the kind and amount of clay in the soil and on measurements of similar soils. The size of the load and the magnitude of the change in soil moisture content also influence the swelling of soils. Shrinking and swelling of some soils can cause damage to building foundations, basement walls, roads, and other structures unless special designs are used. A high shrink-swell potential indicates that special design and added expense may be required if the planned use of the soil will not tolerate large volume changes.

Erosion factors are used to predict the erodibility of a soil and its tolerance to erosion in relation to specific kinds of land use and treatment. The soil erodibility factor (K) is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible. K values range from 0.10 to 0.64. To estimate annual soil loss per acre, the K value of a soil is modified by factors representing plant cover, grade and length of slope, management practices, and climate. The soil-loss tolerance factor (T) is the maximum rate of soil erosion, whether from rainfall or soil blowing, that can occur without reducing crop production or environmental quality. The rate is expressed in tons of soil loss per acre per year.

Soil and water features

Table 15 contains information helpful in planning land uses and engineering projects that are likely to be affected by soil and water features.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are placed in one of four groups on the basis of the intake of water after the soils have been wetted and have received precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist chiefly of deep, well drained to excessively drained sands or gravels. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils that have a layer that impedes the downward movement of water or soils that have moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clay soils that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding is the temporary covering of soil with water from overflowing streams, with runoff from adjacent slopes, and by tides. Water standing for short periods after rains or after snow melts is not considered flooding, nor is water in swamps and marshes. Flooding is rated in general terms that describe the frequency and duration of flooding and the time of year when flooding is most likely. The ratings are based on evidence in the soil profile of the effects of flooding, namely thin strata of gravel, sand, silt, or, in places, clay deposited by floodwater; irregular decrease in organic-matter content with increasing depth; and absence of distinctive soil horizons that form in soils of the area that are not subject to flooding. The ratings are also based on local information about floodwater levels in the area and the extent of flooding and on information that relates the position of each soil on the landscape to historic floods.

The generalized description of flood hazards is of value in land-use planning and provides a valid basis for land-use restrictions. The soil data are less specific, however, than those provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table is the highest level of a saturated zone more than 6 inches thick for a continuous period of more than 2 weeks during most years. The depth to a seasonal high water table applies to undrained soils. Estimates are based mainly on the relationship between grayish colors or mottles in the soil and the depth to free water observed in many borings made during the course of the soil survey. Indicated in table 15 are the depth to the seasonal high water table; the kind of water table, that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. Only saturated zones above a depth of 5 or 6 feet are indicated.

Information about the seasonal high water table helps in assessing the need for specially designed foundations, the need for specific kinds of drainage systems, and the need

for footing drains to insure dry basements. Such information is also needed to decide whether or not construction of basements is feasible and to determine how septic tank absorption fields and other underground installations will function. Also, a seasonal high water table affects ease of excavation.

Depth to bedrock is shown for all soils that are underlain by bedrock at a depth of 5 to 6 feet or less. For many soils, the limited depth to bedrock is a part of the definition of the soil series. The depths shown are based on measurements made in many soil borings and on other observations during the mapping of the soils. The kind of bedrock and its hardness as related to ease of excavation is also shown. Rippable bedrock can be excavated with a single-tooth ripping attachment on a 200-horsepower tractor, but hard bedrock generally requires blasting.

Potential frost action refers to the likelihood of damage to pavements and other structures by frost heaving and low soil strength after thawing. Frost action results from the movement of soil moisture into the freezing temperature zone in the soil, which causes ice lenses to form. Soil texture, temperature, moisture content, porosity, permeability, and content of organic matter are the most important soil properties that affect frost action. It is assumed that the soil is not covered by insulating vegetation or snow and is not artificially drained. Silty and clayey soils that have a high water table in winter are most susceptible to frost action. Well drained very gravelly or sandy soils are the least susceptible.

Risk of corrosion pertains to the soil-induced chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to the soil moisture, particle-size distribution, total acidity, and electrical conductivity of the soil material. The rate of corrosion of concrete is based mainly on the sulfate content, texture, and acidity of the soil. Protective measures for steel or more resistant concrete help to avoid or minimize damage resulting from the corrosion. Uncoated steel intersecting soil boundaries or soil layers is more susceptible to corrosion than an installation that is entirely within one kind of soil or within one soil layer.

Formation of the soils

In this section the factors and processes that have affected the formation and morphology of the soils in Augusta County are discussed.

Factors of soil formation

Soil is formed by weathering and other processes that act upon parent material. The characteristics of the soil at any given point depend upon interaction of (1) parent material, (2) climate, (3) plants and animals, (4) relief, and (5) time.

Climate and plants and animals are the active forces of soil formation. They act on the parent material accumulated through the weathering of rocks and slowly change it into soil. Although all five factors affect the formation of every soil, the relative importance of each differs from place to place. In extreme cases one factor may dominate in the formation of a soil and fix most of its properties. In general, however, it is the combined action of the five factors that determines the character of each soil.

Parent material. The unconsolidated mass from which a soil formed is parent material. It is largely responsible for the chemical and mineralogical composition of the soil and the rate at which soil-forming processes take place.

Parent materials in Augusta County are of three kinds: residual, alluvial, and colluvial. Some of the residual parent materials are limestone, shale, sandstone, and greenstone. Soils formed in residuum from limestone, dolomite, and shale are most extensive in the Shenandoah Valley and have a wide range of characteristics. Limestone-derived soils typically have a silty surface layer and a clayey subsoil. Examples are the Endcav and Frederick soils. Residuum from acid shale and siltstone is the parent material for the Weikert and Berks soils. The coarse textured acid sandstone residuum weathers to form the coarse textured Lehew soils. Greenstone-derived soils are confined to the Blue Ridge Mountains in this county and include the Lew soils.

Alluvial parent materials are of local origin along the smaller streams and of local and general origin along the major rivers. Soils derived from alluvium vary widely in texture and development. Examples are the Atkins, Chagrin, Chavies, Monongahela, and Purdy soils.

Colluvial parent materials are dominantly along lower mountain slopes, and they are primarily coarse textured or medium textured. Examples are the Jefferson and Ernest soils.

Climate. As a genetic factor, climate affects the physical, chemical, and biological relationships in soils, principally through the influence of precipitation and temperature. Water dissolves minerals, supports biological activity, and transports mineral and organic residue through the solum. Temperature determines the types of physical, chemical, and biological activities that take place and the speed at which they act.

Because precipitation exceeds evapotranspiration, the humid climate has caused the soils to be leached. Much of the soluble materials that originally were present or were released through weathering have been removed. Exceptions to this are alluvial areas which are recharged with carbonates by limestone springs and soils that are shallow to calcareous rock. Precipitation is mainly responsible for the subsoil that characterizes most soils in the county. In addition to leaching soluble materials, water that percolates through the soil moves clay from the surface layer to a subsoil layer. Except for soils formed in recent alluvium or sand or on very steep slopes, soils of the county typically have a subsoil that contains more clay than the surface layer.

Also influenced by climate is the formation of blocky structure in the subsoil of well developed soils. The development of peds (aggregates) in the subsoil is caused partly by changes in volume of the soil mass that are primarily the result of alternate wetting and drying.

Plant and animal life. Micro-organisms, vegetation, animals, and man are major factors in the formation of soils. Vegetation is generally responsible for the amount of organic matter, color of the surface layer, and the amount of nutrients. Earthworms, cicada, and burrowing animals help keep the soil open and porous. Micro-organisms decompose the vegetation and dead animal matter, thus releasing nutrients for plant food. During settlement, man changed the soil by mixing the layers.

Before settlement by man, native vegetation was the major living organism affecting soil development. The native vegetation consisted mainly of hardwoods. The oaks, hickories, and chestnuts were the dominant trees in the original forest cover, and hemlock and white pine were the most abundant conifers in the cooler areas. Most hardwoods use a large amount of the available calcium and other bases and constantly recycle them through leaf fall and decay. This characteristic of the hardwoods has prevented the soils of Augusta County from becoming as badly leached as they would have been under a coniferous forest cover. This is true primarily of the valley portion of the county, which is underlain by carbonate rocks; but the soils of the mountainous regions of the county that are underlain by acid parent rock are more leached, even though they also have a hardwood forest. This is caused by the lower calcium and base content of the original parent material.

As farming developed in the county, man became an important factor in the development of the soils. The clearing of the forests, land cultivation, introduction of new plants, and changes in natural drainage all have their effect on soil development. The most important changes brought about by man are the mixing of the upper layers of the soil to form a plow layer; cultivating strongly sloping soils, resulting in accelerated erosion; and liming and fertilizing to change the content of plant nutrients, especially in the upper layers.

Relief. The underlying geologic formations, the geologic history of the general region, and the effects of dissection by rivers and streams largely determine the relief of an area. Relief influences soil formation through its effects on moisture relationships, erosion, temperature, and plant cover.

Augusta County is bordered by mountains on either side that approach or exceed 4,000 feet in elevation. These mountain systems are underlain by resistant rocks such as metabasalts, sandstones, and quartzites. The valley relief is also affected by the underlying geology. The Edinburg limestones and Martinsburg shale consistently form areas having the least relief. The more hilly valley areas are characteristically underlain by other rocks, especially Beekmantown Dolomite, which generally contains massive chert beds. The shale areas of the county have a more well defined (dendritic) drainage pattern than the nonshale areas.

Most upland areas are well drained. Soils on the terraces and flood plains range from well drained to poorly drained. Drainage is commonly related to the texture and position of the alluvium. Thus, fine-textured slackwater deposits in low positions commonly are poorly drained and deep deposits of coarser materials are well drained.

Time. As a factor of soil formation, time generally is related to the degree of development or degree of horizon differentiation within the soil. A soil that has little or no horizon development is considered a young soil, and one that has strongly developed horizons is considered an old, or mature, soil.

The oldest soils in Augusta County are those formed in residuum from carbonate rock. In general, these soils are in less sloping, relatively stable positions and formed in easily weatherable materials. These older soils have a strong degree of horizon differentiation. On very steep slopes, geologic erosion removed soil material in a relatively short period of time and the soils generally have not been in place long enough to develop more than a moderate horizon differentiation. Soils formed in recent alluvium have been in place only a relatively short time and show little or no development other than an accumulation of organic matter in the surface layer. They are commonly stratified and have an irregular distribution of organic matter.

Processes of soil formation

In Augusta County several processes are involved in the formation of soil horizons. Among these are the accumulation of organic matter, the leaching of soluble salts, the reduction and transfer of iron, the formation and translocation of clay minerals, and the layering of parent materials. These processes are continually taking place and generally at the same time throughout the profile. Such processes have been going on for thousands of years.

The accumulation of organic matter takes place with the decomposition of plant residue. In many places in Augusta County the layer of organic matter has been eroded away or has been mixed with materials from underlying layers through cultivation. The organic matter content of the surface layers in the county varies from low in sandy soils, such as Craigsville soils, to high in medium textured, flood-plain soils, such as Massanetta soils. A low to medium amount of organic matter is dominant for the soils in the county.

In order for soils to have a distinct subsoil, it is believed that some of the lime and other soluble salts are leached before the translocation of clay minerals. Among the factors that affect this leaching are the kinds of salts originally present, the annual precipitation, and the texture of the soil profile. Most of the soils in the county are leached. Exceptions to this are alluvial soils, which are recharged

with carbonates by limestone springs, and soils that are shallow to calcareous rock.

Gleying, or the process of chemical reduction and transfer of iron, occurs in soils where drainage is impeded. The naturally wet soils of Augusta County have some degree of gleying in one or more of their layers. Atkins and Purdy soils are examples of soils that have been affected by gleying because of a high water table.

Iron that has been reduced in areas where the soil is poorly aerated generally becomes mobile and commonly is removed from the soil. Part of the mobile iron moves either within the layer where it originated or to another layer. Part of this iron is segregated and reoxidized to form the red, yellowish red, strong brown, and yellowish brown mottles that are common in some layers of soils having impeded drainage. The reduction, segregation, and reoxidation of iron has occurred in the Buchanan soils.

When silicate clay forms from primary materials, some iron generally is freed as hydrated oxide. Depending on the degree of hydration, such oxides normally are reddish. In most well developed and freely aerated soils in Augusta County, hydrated iron oxide will color the subsoil strongly. For example, the clayey subsoil in the Unison soils is strongly colored by free iron oxide.

The weathering of primary minerals to silicate clay minerals, largely by the process of hydrolysis, results finally in the production of kaolinitic clays. Kaolinite is regarded as the most common clay mineral in the soils of Augusta County. Other clays, such as montmorillonite and illite, occur in smaller amounts. A few soils, such as Endcav and Chilhowie soils, have a subsoil that has more montmorillonite than other soils in the county.

Layering influences the formation of soil layers in several ways. The formation of silicate clays varies directly with the amount of weatherable minerals in each layer. A layer high in slowly weatherable quartz sand forms less silicate clay than a layer high in easily weathered, silt-sized minerals. Water commonly moves more slowly between layers of different textures, and this results in a temporary excess of water in the upper layers. As the water slows down, minerals carried down by percolation are deposited or are precipitated, commonly forming a compact layer or a clay layer that is slowly permeable to very slowly permeable. If the compact layer is high in sand or silt and is brittle, it is called a fragipan. Genesis of the fragipan is not fully understood, but studies show that swelling and shrinking takes place in vertical cracks during alternating wet and dry periods. This may account for the packing of soil particles and also for a gross polygonal pattern of cracks in the fragipan. Clay, silica, and oxides of aluminum are the most likely cementing agents causing brittleness and hardness. The Buchanan soils are an example of an Augusta County soil that has a well developed fragipan.

Soil series and morphology

In this section, each soil series recognized in the survey area is described in detail. The descriptions are arranged in alphabetic order by series name.

Characteristics of the soil and the material in which it formed are discussed for each series. The soil is then compared to similar soils and to nearby soils of other series. Then a pedon, a small three-dimensional area of soil that is typical of the soil series in the survey area, is described. The detailed descriptions of each soil horizon follow standards in the Soil Survey Manual (*3*). Unless otherwise noted, colors described are for moist soil.

Following the pedon description is the range of important characteristics of the soil series in this survey area. Phases, or map units, of each soil series are described in the section "Soil maps for detailed planning."

Allegheny series

The Allegheny series consists of fine-loamy, mixed, mesic Typic Hapludults. These deep, well drained soils formed in alluvium washed from uplands underlain by sandstone, shale, and limestone. The Allegheny soils are on terraces along the major streams and rivers. Slopes range from 1 to 15 percent.

Allegheny soils are commonly near Craigsville, Chavies, Monongahela, Buchanan, and Shenval soils. Allegheny soils contain fewer coarse fragments in the subsoil than the Craigsville soils. Allegheny soils are finer textured than the Chavies soils. They are better drained than the Monongahela and Buchanan soils and do not have a fragipan. Allegheny soils are browner and coarser textured than the Shenval soils.

Typical pedon of Allegheny fine sandy loam, 1 to 7 percent slopes, in George Washington National Forest, 1 mile southwest of intersection of Forest Service roads 95 and 96, 100 yards north of Forest Service road 96:

O1—2 inches to 0, undecomposed and partially decomposed leaves, needles, and twigs.

Ap—0 to 6 inches, dark brown (10YR 4/3) fine sandy loam; weak medium granular structure; very friable; many fine roots; 10 percent pebbles; very strongly acid; abrupt smooth boundary.

B1—6 to 12 inches, dark yellowish brown (10YR 4/4) loam; weak fine granular structure; very friable; many fine roots; 15 percent pebbles; very strongly acid; clear smooth boundary.

B21t—12 to 23 inches, dark brown (7.5YR 4/4) sandy clay loam; moderate very fine subangular blocky structure; friable; faint patchy clay films on peds; common fine roots; 3 percent pebbles; very strongly acid; gradual smooth boundary.

B22t—23 to 34 inches, dark brown (7.5YR 4/4) sandy clay loam; moderate fine subangular blocky structure; friable; common fine roots; 3 percent pebbles; thin

patchy clay films on peds; very strongly acid; abrupt wavy boundary.

C—34 to 60 inches, yellowish brown (10YR 5/6) sandy loam; common fine distinct light gray (10YR 7/1) mottles; weak medium subangular blocky structure; friable; 40 percent pebbles and cobbles; few fine roots; very strongly acid.

The solum is 30 to 42 inches thick. Depth to bedrock is more than 5 feet. Rounded sandstone pebbles and cobblestones make up 3 to 15 percent of the surface layer and subsoil and 20 to 60 percent of the substratum.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 4. The A horizon ranges from fine sandy loam to cobbly fine sandy loam.

The B horizon has hue of 10YR and 7.5YR, value of 4 or 5, and chroma of 4 through 6. The B horizon is silt loam, loam, fine sandy loam, and sandy clay loam.

The C horizon is sandy loam, fine sandy loam, loam, and sandy clay loam and their gravelly and cobbly counterparts. In some areas, a IIC horizon of stratified sand and gravel is at a depth of more than 42 inches.

Aqualfs

Aqualfs in Augusta County consist of deep, poorly drained soils that have an argillic horizon with a dominant chroma of 2 or less. Aqualfs have base saturation of more than 35 percent in the lower part of the B horizon and in the C horizon. They formed in alluvium washed from soils underlain by limestone and calcareous shale. The soils are in depressions, on terraces, and at the heads of and along drainageways in the limestone uplands. Slopes range from 0 to 8 percent but are dominantly 0 to 3 percent.

Aqualfs commonly are near Buchanan, Chilhowie, Edom, and Endcav soils. Aqualfs are not so well drained as these soils. They do not have the fragipan typical of the Buchanan soils and have a darker colored subsoil than the Chilhowie, Edom, and Endcav soils.

Because of the variability of these soils, a typical pedon is not given. The solum ranges from 20 to more than 60 inches thick, and depth to bedrock is 3 to more than 10 feet. Pebbles and shale fragments make up 0 to 5 percent of the solum and 0 to 35 percent of the substratum. Some pedons have stratified layers of sand or sand and gravel at a depth of more than 30 inches. The soils are medium acid to mildly alkaline.

The A horizon dominantly has hue of 10YR or 2.5Y, value of 2 through 5, and chroma of 1 through 4. It is fine sandy loam and silt loam to heavy silty clay loam and is 5 to 12 inches thick.

The B horizon dominantly has hue of 10YR or 2.5Y, value of 2 through 5, and chroma of 0 through 6. High-chroma mottles are common. The B horizon is friable fine sandy clay loam to firm, sticky and plastic clay. It ranges from 16 to more than 48 inches thick.

The C horizon ranges from sandy clay loam or silty clay loam to clay and gravelly, very gravelly, cobbly, very cobbly, or very shaly analogues.

Aquents

Aquents in Augusta County consist of moderately deep to deep, somewhat poorly drained to poorly drained soils that are saturated during the wetter months and have dominant chroma of 2 or less within 20 inches of the surface. The soils formed in colluvium or alluvium washed from soils underlain by acid shale or mixed acid shale and sandstone. The soils are on toe slopes and at the heads of and along small drainageways. Slopes range from 0 to 4 percent.

Aquents commonly are near Berks and Weikert soils. Aquents are not so well drained as these soils, contain less clay than the Berks soils, and are deeper than the Weikert soils.

Because of the variability of these soils, a typical pedon is not given. Depth to fractured shale ranges from 2 to more than 5 feet. Shale fragments make up 2 to 75 percent of the surface layer and 25 to 80 percent of the substratum. The amount of shale fragments and the depth, color, and drainage vary widely. The soils are medium acid to neutral.

The A horizon dominantly has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It ranges from silt loam to very shaly silt loam and is 6 to 14 inches thick.

The C horizon dominantly has hue of 10YR or 2.5Y, value of 3 through 5, and chroma of 0 through 2. High-chroma mottles are common. The C horizon ranges from shaly to very shaly silt loam.

Atkins series

The Atkins series consists of fine-loamy, mixed, acid, mesic Typic Fluvaquents. These deep, poorly drained soils formed in alluvium washed from soils underlain by sandstone and shale. The soils are on flood plains along the major streams and rivers. Slopes range from 0 to 4 percent.

Atkins soils commonly are near Philo, Craigsville, and Chavies soils. Atkins soils are not so well drained as those soils, and they have a grayer subsoil.

Typical pedon of Atkins fine sandy loam, 2 miles southeast of Stuarts Draft, 3,400 feet southwest of intersection of Route 634 and N&W Railroad, and 3,000 feet northwest from intersection of Route 634 and South River:

Ap1—0 to 4 inches, very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; many fine roots; 4 percent rounded sandstone and quartzite pebbles as much as 1/4 inch thick; medium acid; abrupt smooth boundary.

Ap2g—4 to 9 inches, dark gray (10YR 4/1) fine sandy loam; common fine distinct yellowish red (5YR 4/6) and few fine faint very dark gray (10YR 3/1) and very

dark grayish brown (10YR 3/2) mottles; weak fine granular structure; very friable; many fine roots; few black (10YR 2/1) charcoal fragments as much as 1/2 inch thick; 2 percent rounded sandstone pebbles as much as 1/4 inch thick; very strongly acid; abrupt smooth boundary.

B1g—9 to 14 inches, dark gray (10YR 4/1) loam; weak fine subangular blocky structure; friable; many fine roots; dark reddish brown (5YR 3/4) and brown (7.5YR 4/4) coatings along old root channels; very strongly acid; abrupt smooth boundary.

B21g—14 to 21 inches, black (10YR 2/1) loam; weak fine subangular blocky structure; friable; slightly sticky, slightly plastic; common fine roots; dark reddish brown (5YR 3/4) and brown (7.5YR 4/4) coatings on old root channels; very strongly acid; smooth boundary.

B22g—21 to 25 inches, dark gray (10YR 4/1) sandy loam; weak fine granular structure; very friable; common fine roots; dark yellowish brown (10YR 4/4) coatings along old root channels; very strongly acid; clear broken boundary.

B23g—25 to 33 inches, dark gray (10YR 4/1) fine sandy loam; weak fine subangular blocky structure; friable; slightly sticky, slightly plastic; few fine roots; strong brown (7.5YR 4/6) and yellowish brown (10YR 5/6) coatings along old root channels; very strongly acid; gradual wavy boundary.

B24g—33 to 40 inches, very dark gray (10YR 3/1) sandy clay loam; weak fine subangular blocky structure; friable; slightly sticky, slightly plastic; few fine roots; yellowish brown (10YR 5/6) coatings along old root channels; very strongly acid; gradual wavy boundary.

Cg—40 to 67 inches, gray (10YR 5/1) and dark gray (10YR 4/1) sandy clay loam; massive; sticky and plastic; few fine roots; strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6) coatings along old root channels; pockets of dark gray (10YR 3/1) clay; very strongly acid.

The solum thickness ranges from 30 to 50 inches. Depth to bedrock is more than 5 feet. Coarse fragments consisting of sandstone and quartzite make up 0 to 20 percent of the solum and 0 to 60 percent of the substratum.

The A horizon has value of 2 through 4 and chroma of 2 or 3. High-chroma mottles are common.

The Bg horizon has value of 2 through 4 and chroma of 1 or 2. It is sandy loam, fine sandy loam, loam, sandy clay loam, and light silty clay loam.

The Cg horizon has value of 5 or 6 and chroma of 1 or 2. It is sandy loam, sandy clay loam, loam, and silt loam. Some pedons have a IIC horizon of sand and gravel at a depth of more than 4 feet.

Berks series

The Berks series consists of loamy-skeletal, mixed, mesic Typic Dystrochrepts. These moderately deep, well drained soils formed in material weathered from acid shale containing strata of fine grained sandstone and calcareous shale. The Berks soils are on strongly dissected shale uplands, mountaintops, and side slopes. Slopes range from 2 to 60 percent.

Berks soils commonly are near Weikert, Sequoia, Chilhowie, Monongahela, Lehew, and Hazleton soils. Berks soils have a thicker solum and are deeper to shale rock than the Weikert soils, have less clay in the subsoil and more coarse fragments throughout than the Sequoia and Chilhowie soils, contain more coarse fragments in the subsoil and do not have the fragipan typical of the Laidig soils, and have a finer textured subsoil than the Lehew and Hazleton soils.

Typical pedon of Berks shaly silt loam in an area of Berks-Weikert shaly silt loams, 2 to 7 percent slopes, eroded, 1 mile south of intersection of Routes 792 and 612, 30 feet east of Route 612:

Ap1—0 to 7 inches, dark brown (10YR 4/3) shaly silt loam; weak fine granular structure; friable; common fine roots; 20 percent shale fragments; few worm casts; neutral; clear smooth boundary.

Ap2—7 to 10 inches, yellowish brown (10YR 5/4) shaly silt loam; weak fine granular structure; friable; common fine roots; 20 percent shale fragments; neutral; abrupt smooth boundary.

B21—10 to 19 inches, yellowish brown (10YR 5/6) and pockets of strong brown (7.5YR 5/6) shaly silt loam; moderate fine subangular blocky structure: friable; few fine roots; 40 percent shale fragments; strongly acid; gradual wavy boundary.

B22—19 to 27 inches, strong brown (7.5YR 5/6) very shaly loam; moderate fine subangular blocky structure; friable; few fine roots; 60 percent yellowish brown shale fragments; very strongly acid; clear wavy boundary.

C—27 to 30 inches, yellowish brown (10YR 5/4) very shaly silt loam as coatings on shale fragments; structure obscured by coarse fragments; friable; 75 percent weathered shale; strongly acid.

Cr—30 inches, yellowish brown weathered shale with some silt coatings in fissures.

The solum thickness is 18 to 30 inches. Depth to shale bedrock is 20 to 40 inches. Shale, siltstone, and fine-grained sandstone make up 15 to 50 percent of the surface layer, 25 to 50 percent of the subsoil, and 60 to 80 percent of the substratum.

The A horizon has value of 3 through 5 and chroma of 3 or 4. It is shaly silt loam and channery silt loam.

The B horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 through 8. It is shaly, very shaly,

channery, or very channery silt loam, loam, or light silty clay loam.

The C horizon is very shaly or very channery silt loam, loam, or light clay loam.

Bookwood series

The Bookwood series consists of fine-loamy, mixed, mesic Ultic Hapludalfs. These moderately deep, well drained soils formed in material weathered from siliceous limestone and interbedded calcareous shale. The soils are on uplands of the limestone valley. Slopes range from 2 to 45 percent.

Bookwood soils commonly are near Christian, Endcav, Frederick, and Timberville soils. They have a thinner solum than any of these soils, and they have less clay than the Christian, Endcav, or Frederick soils.

Typical pedon of Bookwood silt loam, 2 to 7 percent slopes, eroded, a half mile northeast of junction of State routes 701 and 604, 600 feet northeast of State route 701:

Ap—0 to 6 inches, yellowish brown (10YR 5/4) silt loam; weak fine granular structure; very friable; many fine roots; 15 percent olive yellow (2.5Y 6/6) strongly weathered limestone and fine grained sandstone fragments as much as 2 inches in diameter; medium acid; abrupt smooth boundary.

B21t—6 to 17 inches, strong brown (7.5YR 5/8) gravelly loam; weak fine and medium subangular blocky structure; friable; few fine roots; thin discontinuous yellowish red (5YR 5/6) clay films; few oxide concretions; 25 percent olive yellow (2.5Y 6/6) soft strongly weathered limestone and reddish yellow (7.5YR 6/8) sandstone fragments as much as 3 inches in diameter; medium acid; gradual wavy boundary.

B22t—17 to 30 inches, strong brown (7.5YR 5/8) gravelly clay loam; streaks of yellow (10YR 7/6); weak fine and medium subangular blocky structure; firm; few fine roots; thin discontinuous yellowish red (5YR 5/6) clay films; few oxide stains and concretions; 30 percent olive yellow (2.5Y 6/6) strongly weathered limestone and reddish yellow (7.5YR 6/8) sandstone; medium acid; gradual irregular boundary.

B3—30 to 36 inches, yellowish red (5YR 5/8) strongly weathered limestone and strong brown (7.5YR 5/8) siltstone intermixed with yellowish red (5YR 5/6) silty clay loam; moderate very fine subangular blocky structure; firm; thin yellowish red (5YR 5/6) clay films; 60 percent limestone and siltstone fragments; medium acid; gradual irregular boundary.

Cr—36 to 41 inches, yellowish red (5YR 5/8) strongly weathered limestone and siltstone; medium acid.

R—41 inches, hard limestone and siltstone.

The solum thickness and depth to a paralithic contact ranges from 20 to 40 inches. Depth to a lithic contact ranges from 40 to 60 inches or more. Siliceous limestone, siltstone, sandstone, and shale fragments make up 2 to 20 percent of the A horizon, 3 to 35 percent of the B horizon, and 40 to 70 percent of the C horizon.

The A horizon has value of 5 or 6 and chroma of 4 through 6.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 5 through 8. It is heavy silt loam, loam, clay loam, or gravelly, channery, or shaly analogues.

The B3 horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 5 through 8. It is clay loam, silty clay loam, or silty clay.

Buchanan series

The Buchanan series consists of fine-loamy, mixed, mesic Aquic Fragiudults. These deep, somewhat poorly drained soils formed in old alluvium and colluvium from soils derived mainly from acid sandstone and shale. The Buchanan soils are on smooth, broad terraces and slightly concave lower mountain foot slopes. Slopes range from 0 to 15 percent.

Buchanan soils are commonly near Allegheny, Monongahela, Cotaco, and Purdy soils. Buchanan soils are not so well drained as the Allegheny, Monongahela, and Cotaco soils and are better drained than the Purdy soils.

Typical pedon of Buchanan fine sandy loam, 0 to 2 percent slopes, 3/4 mile west of Stuarts Draft, 30 feet north of N&W Railroad, and 100 feet east of private road to Porter's Manufacturing Plant.

Ap1—0 to 3 inches, very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; many fine and few medium roots; few rounded sandstone pebbles; strongly acid; abrupt smooth boundary.

Ap2—3 to 8 inches, brown (10YR 5/3) fine sandy loam; weak fine granular structure; friable; few fine roots; few rounded sandstone pebbles; strongly acid; abrupt smooth boundary.

A2—8 to 11 inches, pale brown (10YR 6/3) loam; common fine faint yellowish brown (10YR 5/6) and very pale brown (10YR 7/3) mottles; weak medium granular structure; friable; few fine roots; few rounded sandstone pebbles; very strongly acid; abrupt smooth boundary.

Bt—11 to 20 inches, yellowish brown (10YR 5/4) sandy clay loam; common fine and medium distinct light gray (10YR 7/2), strong brown (7.5YR 5/6), and brownish yellow (10YR 6/6) mottles; moderate fine and medium subangular blocky structure; friable; few fine roots; few thin patchy clay films; few rounded sandstone pebbles; very strongly acid; clear smooth boundary.

Bx1—20 to 27 inches, yellowish brown (10YR 5/6) light clay loam; common fine and medium distinct light gray (10YR 7/2), yellowish brown (10YR 5/8), and strong brown (7.5YR 5/6) mottles; moderate thick platy structure parting to moderate fine subangular

blocky; friable; few fine roots; slightly brittle; thin patchy clay films; 3 percent rounded sandstone pebbles; very strongly acid; clear wavy boundary.

Bx2—27 to 36 inches, yellowish brown (10YR 5/6) light clay loam; common medium and coarse light gray (10YR 7/2) and brownish yellow (10YR 6/6) mottles; moderate thick platy structure parting to moderate fine subangular blocky; friable; brittle; thin continuous dark yellowish brown (10YR 4/4) clay films; vertical fissures of pale brown (10YR 6/3) 1/2 inch thick; few rounded sandstone pebbles; very strongly acid; clear smooth boundary.

Bx3—36 to 44 inches, brownish yellow (10YR 6/6) fine sandy loam; common fine and medium distinct light gray (10YR 7/2) and brownish yellow (10YR 6/6) mottles; weak thick platy structure parting to weak fine subangular blocky; friable; slightly brittle; thin patchy strong brown (7.5YR 5/6) clay films; 10 percent rounded sandstone pebbles; 2 percent rounded sandstone cobbles and stones; very strongly acid; gradual smooth boundary.

C1g—44 to 55 inches, gray (7.5YR 6/0), brownish yellow (10YR 6/8), and dark brown (7.5YR 4/4) clay; massive; friable; light olive brown (2.5Y 5/4) clay flows as much as 1/3 inch wide; very strongly acid; gradual smooth boundary.

C2g—55 to 60 inches, light gray (10YR 7/1) sandy clay loam; common fine distinct pink (5YR 7/3) and common medium distinct brownish yellow (10YR 6/8) mottles; massive; friable; few thin dark yellowish brown (10YR 4/4) clay flows less than 1/8 inch wide; very strongly acid.

The solum thickness ranges from 40 to 60 inches. Depth to bedrock is more than 5 feet. Depth to the fragipan ranges from 16 to 24 inches. Coarse fragments make up 0 to 40 percent of the surface layer, 0 to 35 percent of the subsoil, and 5 to 60 percent of the fragipan and substratum. Coarse fragments consist chiefly of sandstone and quartzite cobblestones and pebbles.

The A horizon has value of 4 through 6 and chroma of 2 through 4. It is fine sandy loam, loam, silt loam, and cobbly fine sandy loam.

The Bt horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 4 through 6. Low-chroma mottles are common. The Bt horizon is sandy clay loam, light clay loam, or loam and their gravelly or cobbly analogues.

The Bx horizon has value of 5 or 6 and chroma of 4 through 8. Low- and high- chroma mottles are common. The Bx horizon is light clay loam, sandy clay loam, sandy loam, and fine sandy loam and their cobbly, very cobbly, gravelly, and very gravelly analogues.

The C horizon is neutral or has hue of 7.5YR to 2.5Y, value of 4 through 7, and chroma of 0 through 8. Low- and high- chroma mottles are common. Textures are the same as those in the Bx horizon.

Buckton series

The Buckton series consists of fine-loamy, mixed, calcareous, mesic Typic Udifluvents. These deep, well drained soils formed in alluvium washed from soils underlain by limestone, calcareous shale, and sandstone. The soils are on flood plains adjacent to the major streams and rivers. Slopes range from 0 to 4 percent.

Buckton soils commonly are near Udifluvents and Fluvaquents and Massanetta, Wheeling, and Millrock soils. Buckton soils are better drained than the Udifluvents, Fluvaquents, and Massanetta soils, contain free carbonates that are not typical in the Wheeling soils, and contain more silt and less sand than the Millrock soils.

Typical pedon of Buckton silt loam about 2 miles northeast of New Hope and approximately 700 feet north of intersection of State routes 608 and 776:

Ap—0 to 7 inches, dark brown (10YR 4/3) silt loam; moderate fine granular structure; very friable; many fine roots; few worm channels and casts; strongly effervescent; moderately alkaline; clear smooth boundary.

B1—7 to 14 inches, dark brown (10YR 3/3) loam; moderate very fine subangular blocky structure; friable; many fine roots; few worm channels and casts; strongly effervescent; moderately alkaline; clear smooth boundary.

B21—14 to 26 inches, very dark grayish brown (10YR 3/2) silt loam; weak fine subangular blocky structure; friable; few fine roots; few worm channels and casts; some chert and strongly weathered shale fragments as much as 2 inches thick; strongly effervescent; moderately alkaline; clear smooth boundary.

B22—26 to 54 inches, dark brown (7.5YR 4/2) loam; moderate very fine subangular blocky structure; friable; some fine roots; few worm channels and casts; some chert and strongly weathered shale fragments as much as 1/8 inch thick; slightly effervescent; mildly alkaline; gradual wavy boundary.

C—54 to 90 inches, dark brown (7.5YR 4/2) silt loam; massive; friable; few worm channels and casts; some shale fragments; strongly effervescent; moderately alkaline.

The solum thickness ranges from 30 to 60 inches. Depth to hard bedrock is more than 5 feet. Secondary lime concretions make up 0 to 5 percent of the solum and increase with depth. Sandstone, chert, and shale fragments as much as 4 inches thick make up 0 to 5 percent of the solum and 0 to 20 percent of the substratum.

The A horizon has value of 4 and chroma of 2 through 4.

The B horizon has hue of 10YR or 7.5YR, value of 3 or 4, chroma of 2 through 4. It is loam, silt loam, and fine sandy loam.

The C horizon is fine sandy loam and sandy clay loam. Stratification is evident in some profiles at a depth of more than 4 feet.

Burketown series

The Burketown series consists of coarse-loamy, siliceous, mesic Typic Fragiudults. These deep, moderately well drained soils formed in old alluvium washed from soils underlain by acid sandstone and shale. The Burketown soils are on terraces along the major streams and rivers. Slopes range from 0 to 15 percent.

Burketown soils commonly are near Monongahela, Shenval, Frederick, Allegheny, and Cotaco soils. Burketown soils have less clay in the subsoil than the Monongahela soils and have a fragipan which is not typical in the Shenval, Frederick, Allegheny, and Cotaco soils.

Typical pedon of Burketown fine sandy loam, 0 to 7 percent slopes, 2 miles southwest of Stuarts Draft, 800 feet northwest of intersection of State routes 608 and 656:

Ap—0 to 6 inches, brown (10YR 5/3) fine sandy loam; weak very fine granular structure; very friable; many fine and few medium roots; very strongly acid; abrupt smooth boundary.

A2—6 to 15 inches, pale brown (10YR 6/3) fine sandy loam; weak fine granular structure; very friable; few fine and medium roots; very strongly acid; clear smooth boundary.

B1—15 to 24 inches, yellowish brown (10YR 5/4) fine sandy loam; weak fine subangular blocky structure; friable; few fine and medium roots; very strongly acid; clear smooth boundary.

B2t—24 to 34 inches, yellowish brown (10YR 5/6) fine sandy loam; weak fine subangular blocky structure; friable; few fine and medium roots; thin discontinuous clay films; very strongly acid; gradual wavy boundary.

Bxt—34 to 48 inches, pale brown (10YR 6/3) heavy fine sandy loam; many coarse faint very pale brown (10YR 7/3) and strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure; firm; brittle; vesicular; few rounded sandstone fragments as much as 1/2 inch thick; very strongly acid; gradual wavy boundary.

IIB2t—48 to 64 inches, yellowish red (5YR 5/6) clay loam; common medium coarse red (5YR 4/8) mottles; weak fine subangular blocky structure; weathered rounded sandstone fragments as much as 1/2 inch in diameter; very strongly acid.

The solum thickness ranges from 40 to 60 inches or more. Depth to bedrock is more than 6 feet. Depth to the fragipan ranges from 25 to 36 inches. Sandstone and chert pebbles make up 0 to 10 percent of the solum.

The A horizon has value of 4 through 6 and chroma of 3 through 6.

The B1 horizon, where present, has value of 4 or 5 and chroma of 4 through 6. The Bt horizon has hue of 5YR through 2.5Y, value of 5 or 6, and chroma of 3 through 6. The Bt horizon is fine sandy loam and sandy loam.

The Bxt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 through 8. It is fine sandy loam and sandy loam. It has common to many high- and low-chroma mottles.

The IIB horizon has hue of 2.5YR or 5YR, value of 5, and chroma of 6 through 8. It is clay loam and fine sandy clay loam.

Cataska series

The Cataska series consists of loamy-skeletal, mixed, mesic, shallow Typic Dystrochrepts. These moderately deep, excessively drained soils formed in material weathered from interbedded shale, slate, siltstone, and phyllite. The Cataska soils are on mountain side slopes along the western flank of the Blue Ridge Mountains. Slopes range from 15 to 70 percent.

Cataska soils commonly are near the Drall, Hartleton, and Lew soils. Cataska soils have less sand and fewer stones than the Drall soils, have a thinner solum and are shallower to bedrock than the Hartleton and Lew soils, and have a coarser textured subsoil than the Lew soils.

Typical pedon of Cataska slaty silt loam, 15 to 45 percent slopes, in George Washington National Forest, 3 miles northeast of Blue Ridge Parkway, 100 yards northeast of intersection of Bald Mountain Tower Road and Flint Mountain Trail:

O1—1 inch to 0, undecomposed and partially decomposed leaves, needles, and twigs.

A1—0 to 2 inches, very dark grayish brown (10YR 3/2) slaty silt loam; moderate fine granular structure; very friable; common fine roots; 20 percent slate fragments less than 5 inches long; extremely acid; abrupt wavy boundary.

A2—2 to 7 inches, yellowish brown (10YR 5/4) slaty silt loam; weak very fine subangular blocky structure; friable; common fine and medium roots; 35 percent slate fragments less than 3 inches long; very strongly acid; clear wavy boundary.

B2—7 to 17 inches, yellowish brown (10YR 5/6) very slaty loam; weak fine subangular blocky structure; friable; common fine and medium roots; 60 percent slate fragments less than 6 inches long; very strongly acid; abrupt wavy boundary.

C—17 to 24 inches, fractured slate and phyllite rocks with cracks containing yellowish brown silt loam soil material and a few fine roots; strongly acid.

R—24 inches, hard slate and phyllite rock.

The thickness of the solum ranges from 14 to 20 inches. Depth to hard slate or phyllite ranges from 20 to 30 inches. Coarse fragments of mostly slate make up 20

to 50 percent of the surface layer and 35 to 70 percent of the subsoil and substratum.

The A1 horizon has value of 3 or 4 and chroma of 2. The A2 horizon has value of 4 or 5 and chroma of 2 through 4.

The B and C horizons have hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 5 or 6.

Chagrin series

The Chagrin series consists of fine-loamy, mixed, mesic Dystric Fluventic Eutrochrepts. These deep, well drained soils formed in alluvium washed from soils derived from limestone and calcareous shale. Chagrin soils are on flood plains adjacent to the major streams and rivers. Slopes are commonly 0 to 4 percent.

Chagrin soils commonly are near Fluvaquents and Wheeling soils. Chagrin soils are better drained than Fluvaquents and do not have the argillic horizon typical of the Wheeling soils.

Typical pedon of Chagrin loam, 2 miles northeast of Verona, 75 feet southwest of Middle River, and 1/2 mile northwest of Route 780:

Ap—0 to 11 inches, dark grayish brown (7.5YR 4/2) loam; weak fine granular structure; very friable; common fine roots; slightly acid; abrupt smooth boundary.

B1—11 to 30 inches, brown (7.5YR 4/4) loam; weak fine granular structure; friable; few fine roots; slightly acid; clear smooth boundary.

B2—30 to 48 inches, brown (7.5YR 4/4) loam; weak fine subangular blocky structure; friable; few shale fragments and rounded sandstone gravel as much as 1/2 inch thick; neutral; clear smooth boundary.

C1—48 to 67 inches, brown (7.5YR 4/4) fine sandy loam; massive; friable; few rounded and angular shale and sandstone gravel as much as 1/2 inch thick; neutral; clear smooth boundary.

C2—67 to 72 inches, brown (7.5YR 4/4) sandy loam; massive; some rounded shale and sandstone fragments as much as 1/2 inch thick; neutral.

The solum thickness ranges from 30 to 48 inches. Depth to hard rock is more than 5 feet. Shale and sandstone fragments make up 0 to 5 percent of the surface layer and subsoil and 0 to 50 percent of the substratum.

The A horizon has hue of 10YR or 7.5YR, value of 4, and chroma of 2 or 3.

The B horizon has value of 3 or 4 and chroma of 2 through 4. It is loam or fine sandy loam.

The C horizon is loamy sand, sandy loam, and fine sandy loam and their gravelly analogues.

Chavies series

The Chavies series consists of coarse-loamy, mixed, mesic Ultic Hapludalfs. These deep, well drained soils formed in alluvium washed mostly from soils underlain by sandstone and shale and in some places by limestone. The soils are on low terraces along the larger streams of the county. Slopes are commonly 0 to 4 percent.

Chavies soils are commonly near Allegheny, Craigsville, Monongahela, and Tioga soils. Chavies soils have less clay and more sand than the Allegheny soils, have fewer pebbles and cobblestones than the Craigsville soils, do not have the fragipan typical of the Monongahela soils, and have an argillic horizon which the Tioga soils do not have.

Typical pedon of Chavies fine sandy loam, 1.6 miles southwest of Mount Solon on west side of route 758, 1/4 mile north of intersection of routes 758 and 747:

Ap—0 to 5 inches, dark brown (7.5YR 4/2) fine sandy loam; weak fine granular structure; very friable; many fine roots; few sandstone pebbles; neutral; abrupt smooth boundary.

A2—5 to 14 inches, dark brown (7.5YR 4/2) fine sandy loam; weak fine granular structure; friable; common fine roots; few worm casts; neutral; clear smooth boundary.

B1—14 to 19 inches, reddish brown (5YR 4/4) fine sandy loam; weak fine subangular blocky structure; friable; few fine roots; few faint oxide stains; slightly acid; gradual smooth boundary.

Bt—19 to 34 inches, reddish brown (5YR 4/4) fine sandy loam; weak medium subangular blocky structure; friable; few fine roots; few thin discontinuous clay films; very strongly acid; gradual smooth boundary.

C1—34 to 44 inches, reddish brown (5YR 4/4) loamy fine sand; single grained; very friable; very strongly acid; clear smooth boundary.

C2—44 to 62 inches, reddish brown (5YR 4/4) very cobbly loamy sand; single grained; very friable; 60 percent sandstone cobblestones; strongly acid.

The solum is 30 to 48 inches thick. Depth to bedrock is more than 5 feet. Rounded sandstone pebbles as much as 3 inches thick and rounded sandstone cobblestones make up 1 to 30 percent of the A horizon and 1 to 5 percent of the B horizon. In some pedons the C horizon is made up of gravel and cobblestones at a depth of more than 40 inches.

The A horizon has hue of 10YR and 7.5YR, value of 4, and chroma of 2 through 4.

The B horizon has hue of 10YR, 7.5YR, and 5YR, value of 4 or 5, and chroma of 3 through 6. It ranges from fine sandy loam to sandy loam and loam.

The C horizon ranges from fine sandy loam, sandy loam, and loamy sand to very gravelly and very cobbly sand.

Chilhowie series

The Chilhowie series consists of very-fine, mixed, mesic Typic Hapludalfs. These moderately deep, well drained soils formed in the weathered products of interbedded

calcareous shale and limestone. The soils are on hilly uplands. Slopes range from 2 to 45 percent.

Chilhowie soils commonly are near Berks, Edom, and Endcav soils. Chilhowie soils have more clay in the subsoil than the Berks soils and have a thinner solum than the Edom or Endcav soils.

Typical pedon of Chilhowie silty clay loam, 7 to 15 percent slopes, eroded, 1 mile northeast of intersection of U. S. highway 11 and State route 793, 300 feet south of State route 793:

Ap—0 to 7 inches, brown (10YR 5/3) silty clay loam; moderate fine granular structure; friable; many fine roots; few shale fragments as much as 1 inch thick; neutral; abrupt smooth boundary.

Bt—7 to 17 inches, strong brown (7.5YR 5/6) clay; moderate fine subangular blocky structure; firm; sticky and plastic; few fine roots; few fine pores; thin discontinuous clay films; small pockets of soil material mixed with 70 to 80 percent strongly weathered shale fragments; neutral; clear wavy boundary.

C—17 to 22 inches, yellowish brown (10YR 5/6) very shaly silty clay loam; fine earth part of the horizon occurs as thin lenses between shale and limestone fragments; massive; firm, slightly sticky and slightly plastic; few fine roots; 70 to 80 percent shale and limestone channers; mildly alkaline; gradual wavy boundary.

R—22 inches, interbedded calcareous shale and limestone; strongly effervescent.

The solum thickness is 10 to 25 inches. Depth to bedrock is 20 to 40 inches. Fragments and flagstones of calcareous shale and limestone make up 2 to 15 percent of the solum and 25 to 80 percent of the substratum. Rock outcrops cover 0 to 10 percent of the soil surface.

The A horizon has hue of 10YR and 7.5YR, value of 3 or 4, and chroma of 2 through 4. It is silty clay loam, silty clay, or shaly silty clay loam.

The B horizon has hue of 7.5YR and 10YR, value of 4 or 5, and chroma of 3 through 8. It is clay or silty clay.

The C horizon has hue of 7.5YR and 10YR, value of 5 or 6, and chroma of 4 through 8. It is very channery silty clay, flaggy silty clay, and flaggy clay.

Christian series

The Christian series consists of clayey, kaolinitic, mesic Typic Hapludults. These deep, well drained soils formed in the weathered products of limestone or interbedded limestone and sandstone. The soils are on uplands. Slopes range from 2 to 45 percent.

Christian soils are commonly near Frederick, Endcav, Edom, and Timberville soils. Christian soils have a thinner solum than the Frederick soils; have a redder subsoil than the Endcav soils; have lower base saturation than Edom soils and do not have the shale fragments typical of the Edom soils; and have a redder, more clayey subsoil than the Timberville soils.

Typical pedon of Christian fine sandy loam, 7 to 15 percent slopes, eroded, west of Staunton city limits, 1,075 feet northwest of intersection of Route 720 and Essex Street:

Ap—0 to 7 inches, yellowish brown (10YR 5/4) fine sandy loam; weak fine granular structure; friable; many fine roots; 10 percent chert and sandstone fragments as much as 1/4 inch thick; few sandstone fragments as much as 5 inches thick; neutral; abrupt smooth boundary.

B21t—7 to 13 inches, yellowish red (5YR 5/8) clay loam; common coarse distinct light yellowish brown (10YR 6/4) and reddish yellow (7.5YR 6/6) mottles; moderate fine subangular blocky structure; friable; few fine roots; few yellowish brown coatings on some peds; thin patchy clay films; 10 percent chert and sandstone fragments as much as 1/4 inch thick; medium acid; clear smooth boundary.

B2t—13 to 40 inches, yellowish red (5YR 5/6) clay; streaks and pockets of brownish yellow (10YR 6/8) silty clay loam and red (2.5YR 5/8) cherty clay; moderate medium subangular blocky structure; firm; few fine roots; thin continuous yellowish red (5YR 5/8) clay films; scattered pockets of chert and sandstone fragments as much as 3 inches thick; very strongly acid; gradual wavy boundary.

C—40 to 70 inches, strong brown (7.5YR 5/8) loam and light yellowish brown (10YR 6/4) silt loam; massive; friable; pockets of yellowish red (5YR 5/6) clay; moderate fine subangular blocky structure; 10 percent soft sandstone fragments as much as 6 inches thick; very strongly acid.

The solum thickness is 40 to 60 inches. Depth to bedrock is 6 to 12 feet or more. Fragments of chert and sandstone make up 0 to 25 percent of the solum.

The A horizon has hue of 10YR to 5YR in severely eroded areas, value of 4 through 6, and chroma of 2 through 6. The surface layer in eroded areas is fine sandy loam, loam, and silty clay loam and their cherty, very cherty, rocky, and very rocky analogues.

The B horizon has hue of 7.5YR, 5YR, and 2.5YR; value of 4 through 6; and chroma of 4 through 8. It is clay loam, sandy clay loam, heavy loam, clay, and silty clay loam.

The C horizon has hue of 10YR, 7.5YR, and 5YR; value of 4 through 6; and chroma of 4 through 8. It is loam, silt loam, sandy clay loam, clay loam, and silty clay loam.

Cotaco series

The Cotaco series consists of fine-loamy, mixed, mesic Aquic Hapludults. These deep, moderately well drained soils formed in alluvium or colluvium from soils derived

mainly from acid sandstone and shales. The Cotaco soils are on terraces. Slopes range from 0 to 15 percent.

Cotaco soils commonly are near Monogahela, Buchanan, Purdy, and Allegheny soils. Cotaco soils do not have the fragipan characteristic of Monongahela and Buchanan soils. They are better drained than the Purdy soils and are not so well drained as the Allegheny soils.

Typical pedon of Cotaco fine sandy loam, in an area of Allegheny-Cotaco fine sandy loams, 1 to 7 percent slopes, 1/2 mile south of intersection of routes 730 and 727, 160 feet east of Route 730:

Ap—0 to 9 inches, yellowish brown (10YR 5/4) fine sandy loam, weak fine granular structure; friable; many fine roots; few sandstone pebbles as much as 1/4 inch thick; strongly acid; abrupt smooth boundary.

B1—9 to 15 inches, yellowish brown (10YR 5/6) loam; weak fine subangular blocky structure; friable; few fine roots; few sandstone pebbles and cobblestones as much as 6 inches thick; strongly acid; clear smooth boundary.

B21t—15 to 22 inches, yellowish brown (10YR 5/6) sandy clay loam; weak fine subangular blocky structure; friable; few fine roots; few thin strong brown (7.5YR 5/6) clay films; few sandstone pebbles as much as 1 inch thick; old root channels filled with yellowish brown fine sandy loam; very strongly acid; clear wavy boundary.

B22t—22 to 29 inches, yellowish brown (10YR 5/8) light clay loam; few fine distinct light brownish gray (10YR 6/2) mottles; moderate fine subangular blocky structure; friable; slightly sticky, slightly plastic; few thin clay films; extremely acid; clear smooth boundary.

B23t—29 to 44 inches, strong brown (7.5YR 5/6) light clay loam; few medium distinct red (2.5YR 4/8) and grayish brown (10YR 5/2) mottles; weak thick platy structure parting to weak fine subangular blocky; firm; slightly sticky, slightly plastic; few fine roots; common thin clay films; common sandstone pebbles as much as 1/2 inch thick; extremely acid; clear smooth boundary.

C—44 to 60 inches, strong brown (7.5YR 5/6) sandy clay loam; massive; friable; 35 percent sandstone pebbles and cobblestones; extremely acid.

The solum thickness ranges from 30 to 50 inches. Depth to bedrock is more than 5 feet. Rounded sandstone and quartzite pebbles and cobblestones make up 0 to 30 percent of the A horizon, 0 to 10 percent of the B horizon, and 5 to 35 percent of the C horizon.

The A horizon has value of 5 or 6 and chroma of 3 through 6. It is fine sandy loam or cobbly fine sandy loam.

The B horizon has hue of 10YR and 7.5YR, value of 4 or 5, and chroma of 4 through 8. Low-chroma mottles are in the lower part of the Bt horizon. The B horizon is loam, sandy clay loam, and light clay loam.

The C horizon has hue of 2.5YR through 10YR, value of 4 through 7, and chroma of 2 through 8. It is sandy loam, sandy clay loam, or light clay loam and gravelly or cobbly analogues.

Cotaco soils in this survey area were mapped only with Allegheny soils.

Cotaco variant

The Cotaco variant consists of clayey, mixed, mesic Aquic Hapludults. These deep, moderately well drained soils formed in alluvium or colluvium from soils derived mainly from acid sandstone and shale. The Cotaco variant soils are on terraces. Slopes range from 0 to 7 percent.

Cotaco variant soils are commonly near Allegheny, Monongahela, Buchanan, and Purdy soils. Cotaco variant soils are not so well drained as the Allegheny soils, do not have the fragipan characteristic of the Monongahela and Buchanan soils, and are better drained than the Purdy soils.

Typical pedon of Cotaco variant silt loam, 100 yards northeast of intersection of State routes 656 and 608, along drainageway in small patch of woods:

O1—2 inches to 1 inch, undecomposed loose leaves and twigs.

O2—1 inch to 0, very dark grayish brown (10YR 3/2) mat of partially decomposed leaves, twigs, and roots.

A1—0 to 2 inches, dark brown (10YR 4/3) silt loam; weak fine granular structure; friable; many fine roots; few black oxide concretions less than 2 millimeters thick; very strongly acid; abrupt smooth boundary.

A2—2 to 8 inches, dark brown (7.5YR 3/2) silt loam; weak fine and medium granular structure; friable; many fine roots; few medium roots; few black oxide concretions less than 2 millimeters thick; very strongly acid; clear smooth boundary.

B1t—8 to 15 inches, brown (7.5YR 4/4) clay; weak fine subangular blocky structure; friable; sticky, slightly plastic; common fine and medium roots; few black oxide concretions less than 2 millimeters thick; very strongly acid; clear wavy boundary.

B21t—15 to 23 inches, brown (10YR 4/3) clay; few fine distinct reddish brown (5YR 4/4) and red (2.5YR 4/8) mottles; weak fine subangular blocky structure; friable; very sticky, slightly plastic; few fine roots; thin patchy clay films; few black oxide concretions less than 2 millimeters thick; very strongly acid; gradual smooth boundary.

B22t—23 to 29 inches, brown (10YR 4/3) clay; common fine faint dark brown (7.5YR 4/4) and dark yellowish brown (10YR 4/4) mottles; moderate fine subangular blocky structure; friable; sticky, slightly plastic; few fine roots; thin continuous dark grayish brown (2.5Y 4/2) clay films on ped surfaces; few black oxide concretions less than 2 millimeters thick; strongly acid; clear wavy boundary.

B23tg—29 to 39 inches, dark grayish brown (10YR 4/2) clay; common fine distinct dark brown (7.5YR 4/4) and few fine distinct strong brown (7.5YR 5/8) mot-

tles; moderate fine subangular blocky structure; firm; sticky and plastic; few fine and very fine roots; thin continuous dark grayish brown (2.5Y 4/2) clay films on ped surfaces and in pores; few black oxide concretions less than 2 millimeters thick; strongly acid; gradual wavy boundary.

B24tg—39 to 61 inches, dark grayish brown (10YR 4/2) clay; common medium distinct dark brown (7.5YR 4/4), reddish brown (5YR 4/4), and yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; slightly sticky, slightly plastic; few fine and very fine roots; thin continuous dark grayish brown (2.5Y 4/2) clay films on ped surfaces; strongly acid; clear smooth boundary.

C—61 to 98 inches, strong brown (7.5YR 5/6) clay; many medium and coarse distinct brownish yellow (10YR 6/6), yellowish red (5YR 4/8), and yellowish brown (10YR 5/4) mottles; massive; friable; few rounded sandstone fragments as much as 5 inches thick; strongly acid.

The solum thickness ranges from 30 to more than 60 inches. Depth to bedrock is more than 5 feet. Pebbles make up 0 to 15 percent of the A horizon, 0 to 10 percent of the B horizon, and 0 to 30 percent of the C horizon. Cobblestones of sandstone and quartzite make up 0 to 30 percent of the C horizon.

The A horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 2 through 6.

The Bt horizon has hues of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 through 8. High-chroma mottles are common in the upper part of the Bt horizon. The Bt horizon is clay loam, silty clay loam, silty clay, and clay.

The C horizon has hue of 10YR and 7.5YR, value of 5 or 6, and chroma of 2 through 8. It is sandy clay loam, clay loam, or clay and their gravelly, cobbly, or very cobbly analogues. Some pedons are underlain by stratified layers of sand or gravel and sand at a depth of more than 48 inches.

Craigsville series

The Craigsville series consists of loamy-skeletal, mixed, mesic Fluventic Dystrochrepts. These deep, well drained soils formed in alluvium washed from soils underlain by shale, sandstone, and quartzite. The Craigsville soils are on low terraces adjacent to the flood plains of the larger streams and rivers. Slopes range from 0 to 4 percent.

Craigsville soils commonly are near Chavies, Allegheny, and Monongahela soils and Udorthents. Craigsville soils have a sandier, less clayey subsoil than the Chavies, Allegheny, and Monongahela soils, do not have the fragipan typical of the Monongahela soils, and have more clay than the Udorthents.

Typical pedon of Craigsville cobbly sandy loam in George Washington National Forest, 5 miles northwest of West Augusta Post Office, 100 yards west of intersection of Forest Service roads 95 and 96, 100 feet south of Road 96:

O1—2 inches to 0, undecomposed and partially decomposed leaves, needles, and twigs.

Ap—0 to 5 inches, dark grayish brown (10YR 4/2) cobbly fine sandy loam; moderate medium granular structure; very friable; many fine and medium roots; 35 percent cobblestones and pebbles; very strongly acid; clear smooth boundary.

B21—5 to 21 inches, dark brown (7.5YR 4/4) gravelly sandy loam; weak medium and fine subangular blocky structure; very friable; common fine and medium roots; 40 percent pebbles and cobblestones; very strongly acid; clear smooth boundary.

B22—21 to 27 inches, reddish brown (5YR 4/4) gravelly sandy loam; weak medium subangular blocky structure; friable; few fine roots; 35 percent pebbles and cobblestones; very strongly acid; gradual wavy boundary.

IIC—27 to 60 inches, reddish brown (5YR 4/4) very gravelly loamy sand; single grained; loose; few fine roots; 65 percent pebbles and cobblestones; very strongly acid.

The solum thickness ranges from 20 to 40 inches. Depth to bedrock is more than 6 feet. Sandstone pebbles and cobblestones make up 15 to 40 percent of the subsoil and 50 to 70 percent of the substratum.

The A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 through 4. It is fine sandy loam or cobbly fine sandy loam.

The B horizon has hue of 5YR through 10YR, value of 4, and chroma of 4 through 6. It is sandy loam, loam, and their gravelly or cobbly counterparts.

The IIC horizon has value of 4 or 5 and chroma of 2 through 4. It is very gravelly or very cobbly sandy loam or very gravelly or very cobbly loamy sand.

Drall series

The Drall series consists of sandy-skeletal, siliceous, mesic Typic Udorthents. These deep, excessively drained soils formed in the weathered products of sandstone and quartzite. Drall soils are on upper mountain side slopes and on mountaintops. Slopes range from 40 to 70 percent.

Drall soils are commonly near Hazleton, Hartleton, Sherando, Cataska, and Leetonia soils. Drall soils have more sand than the Hazleton, Hartleton, Sherando, and Cataska soils, and they do not have the thick bleached A2 horizon typical of the Leetonia soils.

Typical pedon of Drall channery sandy loam, in an area of Drall extremely stony sandy loam, 45 to 80 percent slopes, in George Washington National Forest, on Stony Run Trail, 1/2 mile southeast of Forest Service road 42:

O1—2 inches to 0, undecomposed and partially decomposed leaves, needles, and twigs.

A11—0 to 2 inches, dark grayish brown (10YR 4/2) channery sandy loam; weak coarse granular structure; very friable; common fine and medium roots; 20 percent quartzite fragments; rounded and polished sand grains; very strongly acid; abrupt smooth boundary.

A12—2 to 10 inches, dark yellowish brown (10YR 4/4) channery sandy loam; weak coarse granular structure; very friable; common fine and medium roots; 25 percent quartzite fragments; rounded and polished sand grains; very strongly acid; clear wavy boundary.

B1—10 to 21 inches, yellowish brown (10YR 5/4) very channery loamy sand; very weak fine subangular blocky structure; very friable; common fine and medium roots; 50 percent quartzite fragments; very strongly acid; clear wavy boundary.

B2—21 to 31 inches, yellowish brown (10YR 5/6) very channery loamy sand; weak fine subangular blocky structure; very friable; few fine and medium roots; 60 percent quartzite fragments; very strongly acid; clear wavy boundary.

C1—31 to 46 inches, brownish yellow (10YR 6/6) very channery sand; single grained; loose; few fine roots; 70 percent quartzite fragments; very strongly acid; abrupt wavy boundary.

C2—46 to 52 inches, yellow (10YR 7/6) channery sand; common fine faint very pale brown (10YR 7/3) mottles; weak very thick platy structure; friable; 35 percent quartzite fragments; very strongly acid; abrupt wavy boundary.

IIC3—52 to 58 inches, yellowish brown (10YR 5/6) clay loam; common fine faint strong brown (7.5YR 5/8) and brownish yellow (10YR 6/8) mottles; moderate thin platy structure; firm; 10 percent quartzite fragments; very strongly acid.

IIR—58 inches, hard quartzite rock.

The solum thickness ranges from 20 to 40 inches. Depth to bedrock ranges from 40 to 80 inches. Quartzite and sandstone fragments make up 20 to 55 percent of the A horizon and 35 to 70 percent of the B and C horizons.

The A horizon has value of 4 or 5 and chroma of 2 through 6.

The B horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 4 through 8. It is very channery loamy fine sand and very channery sand.

The C horizon has value of 4 through 7 and chroma of 4 through 8. Some pedons have a thin horizon of clay loam or heavy sandy loam immediately above bedrock.

Edom series

The Edom series consists of fine, illitic, mesic Typic Hapludalfs. These deep, well drained soils formed in the weathered products of calcareous shale or shaly limestone. The Edom soils are on uplands in areas with a distinct dendritic drainage system. Slopes range from 2 to 45 percent.

Edom soils commonly are near Chilhowie, Endcav, Sequoia, and Frederick soils. Edom soils have a thicker solum than the Chilhowie soils, have a thinner solum than the Endcav soils, are less acid than the Sequoia soils, and have a thinner solum and are less acid than the Frederick soils.

Typical pedon of Edom silt loam, 2 to 7 percent slopes, eroded, approximately 1/4 mile north of intersection of State route 793 and U. S. highway 11, and 2/10 mile west of State route 793:

Ap1—0 to 2 inches, brown to dark brown (10YR 4/3) silt loam; weak very fine granular structure; very friable; many fine roots; neutral; abrupt smooth boundary.

Ap2—2 to 8 inches, yellowish brown (10YR 5/4) silt loam; weak fine granular structure; friable; common fine roots; some quartz fragments as much as 1/4 inch thick; many very fine oxide concretions; neutral; abrupt smooth boundary.

B1t—8 to 13 inches, yellowish red (5YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; thin discontinuous clay films; few very fine oxide concretions; slightly acid; gradual wavy boundary.

B2t—13 to 24 inches, yellowish red (5YR 5/8) clay; common coarse distinct red (2.5YR 5/6) and brownish yellow (10YR 6/8) mottles; strong medium subangular blocky structure; firm; few fine roots; thick continuous clay films; few fine oxide stains; slightly acid; gradual wavy boundary.

B3—24 to 40 inches, red (2.5YR 5/6), yellowish red (5YR 5/6), brownish yellow (10YR 6/8), and yellow (10YR 7/8) clay; moderate fine subangular blocky structure; firm; few fine roots; thick discontinuous clay films; small pockets of friable silt loam; many oxide concretions and stains; neutral; gradual irregular boundary.

C—40 to 70 inches, yellowish red (5YR 5/6), brownish yellow (10YR 6/6), and yellow (10YR 7/6) strongly weathered shale fragments; few yellowish red (5YR 5/6) clay coatings on shale fragments in upper part; neutral.

The solum is 20 to 40 inches thick. Depth to bedrock ranges from 3 1/2 to 5 feet or more. Shale fragments or limestone flags make up 0 to 10 percent of the B horizon and 20 to 70 percent of the C horizon.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3 through 6. It is silt loam and silty clay loam.

The B horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 6 through 8. The upper part contains few to common high-chroma mottles. Some pedons have a few low-chroma mottles in the lower part. The B horizon is silty clay, clay, and silty clay loam.

Elliber series

The Elliber series consists of loamy-skeletal, mixed, mesic Typic Hapludults. These deep, well drained soils formed in material weathered from cherty limestone. The soils are on side slopes of cherty knolls and ridges. Slopes range from 15 to 70 percent.

Elliber soils commonly are near Nixa and Frederick soils. Elliber soils do not have the fragipan typical of the Nixa soils and do not have the clayey subsoil typical of the Frederick soils.

Typical pedon of Elliber very cherty silt loam, 15 to 45 percent slopes, 1/4 mile west of Quicks Mill, 150 feet north of State route 612:

O1—2 inches to 0, decidous leaf litter.

A1—0 to 2 inches, very dark grayish brown (10YR 3/2) very cherty silt loam; weak fine granular structure; very friable; many fine roots; 80 percent chert fragments as much as 10 inches long; very strongly acid; clear smooth boundary.

A21—2 to 5 inches, light yellowish brown (10YR 6/4) very cherty silt loam; weak fine subangular blocky structure; friable; common fine roots; 50 percent chert fragments as much as 3/4 inch long; very strongly acid; clear smooth boundary.

A22—5 to 11 inches, pale brown (10YR 6/3) very cherty silt loam; weak fine subangular blocky structure; friable; few fine roots; 55 percent chert fragments as much as 3 inches long; very strongly acid; clear smooth boundary.

B2t—11 to 60 inches, yellowish brown (10YR 5/4) and very pale brown (10YR 7/3) very cherty silt loam; weak fine subangular blocky structure; firm; few fine roots; 50 to 60 percent chert fragments as much as 2 inches long; very strongly acid; gradual smooth boundary.

B3—60 to 63 inches, reddish yellow (7.5YR 6/6) very cherty silt loam; weak fine granular structure; friable; 70 to 80 percent chert fragments as much as 1/2 inch long; strongly acid.

The solum thickness ranges from 40 to 70 inches. Depth to bedrock is more than 5 feet. Coarse fragments of chert make up 50 to 80 percent of the surface layer and 40 to 80 percent of the subsoil.

The A1 horizon has value of 2 or 3 and chroma of 1 or 2.

The A2 horizon has value of 6 or 7 and chroma of 3 or 4.

The B horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 through 6.

Endcav series

The Endcav series consists of very fine, mixed, mesic Typic Hapludalfs. These deep, well drained soils formed in the weathered products of high grade limestone. The soils are on uplands. Slopes range from 2 to 15 percent.

Endcav soils are commonly near Chilhowie, Edom, and Frederick soils. Endcav soils have a thicker solum than the Chilhowie and Edom soils and a thinner solum than the Frederick soils.

Typical pedon of Endcav silt loam, 2 to 7 percent slopes, eroded, 3/8 mile north of intersection of State routes 613 and 607, and 900 feet north of State route 613:

Ap1—0 to 2 inches, dark grayish brown (10YR 4/2) silt loam; weak very fine granular structure; very friable; many fine roots; some oxide concretions as much as 2 millimeters in diameter; clear wavy boundary.

Ap2—2 to 6 inches, brown (10YR 5/3) silt loam; weak fine granular structure; friable; many fine roots; quartz pebbles as much as 1 inch in diameter; few oxide concretions as much as 3 millimeters in diameter; common worm casts; slightly acid; abrupt smooth boundary.

B1—6 to 11 inches, yellowish brown (10YR 5/8) silty clay loam; moderate fine subangular blocky structure; friable; common fine roots; some oxide concretions as much as 2 millimeters in diameter; very strongly acid; clear smooth boundary.

B21t—11 to 18 inches, yellowish brown (10YR 5/8) silty clay; moderate medium subangular blocky structure; firm; few fine roots; thin continuous clay films; few oxide concretions as much as 1 millimeter in diameter; very strongly acid; clear smooth boundary.

B22t—18 to 27 inches, yellowish brown (10YR 5/8) clay; common medium distinct brownish yellow (10YR 6/6) and yellowish red (5YR 5/6) mottles; moderate fine subangular blocky structure; firm; thin continuous films; very strongly acid; clear wavy boundary.

B23t—27 to 51 inches, yellowish brown (10YR 5/8) clay; few fine distinct yellowish red (5YR 5/6) mottles; strong medium subangular blocky structure; firm; sticky and plastic; thin continuous clay films; very strongly acid; clear irregular boundary.

B24t—51 to 60 inches, yellowish brown (10YR 5/8) clay; few fine distinct yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; firm; slightly sticky, slightly plastic; pockets of very thick black (N 2/0) oxide coatings; very strongly acid.

The solum thickness is 40 to 60 inches or more. Depth to bedrock is 4 to 8 feet or more. Fragments of limestone and chert make up 0 to 5 percent of the A horizon and 0 to 15 percent of the B horizon and commonly increase with depth. Few to common black oxide concretions are in the upper part of the Bt horizon and generally increase with depth.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 through 4. It is silt loam, silty clay loam, and rocky phases.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 through 8. High-chroma mottles are common in the lower part of the Bt horizon. The Bt horizon is mostly clay or silty clay but ranges to silty clay loam in the upper part. The Bt horizon is commonly underlain by hard bluish limestone. The C horizon, where present, is commonly thin.

Ernest series

The Ernest series consists of fine-loamy, mixed, mesic Aquic Fragiudults. These deep, moderately well drained soils formed in alluvial or colluvial material washed from soils underlain by acid sandstone and shale. The Ernest soils are at the base of steep slopes adjacent to drainageways. Slopes range from 0 to 15 percent.

Ernest soils commonly are near Udorthents and Craigsville, Monongahela, Berks, and Weikert soils. Ernest soils have a fragipan that is not characteristic of Udorthents, Craigsville, Berks, or Weikert soils; are finer textured than Udorthents or Craigsville soils; and are not so well drained as Monongahela, Berks, or Weikert soils.

Typical pedon of Ernest silt loam, 0 to 7 percent slopes, in George Washington National Forest, 6/10 mile southwest of North River Road and Leading Ridge Road, 60 feet west of second wildlife clearing:

O1—1 inch to 0, leaves and twigs, some partially decayed.

A1—0 to 1 inch, very dark grayish brown (10YR 3/2) silt loam; moderate fine granular structure; very friable; many fine roots; very strongly acid; abrupt smooth boundary.

A2—1 to 11 inches, yellowish brown (10YR 5/4) silt loam; common fine faint yellowish brown (10YR 5/8) mottles; weak fine subangular blocky structure; friable; few fine roots; 2 percent shale and sandstone fragments as much as 1 inch in diameter; very strongly acid; clear smooth boundary.

B1t—11 to 17 inches, brown (10YR 5/3) light silty clay loam; common fine distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; few fine roots; thin discontinuous clay films; 5 percent shale and sandstone fragments as much as 1 inch in diameter; very strongly acid; clear smooth boundary.

B2t—17 to 26 inches, strong brown (7.5YR 5/6) light silty clay loam; common medium distinct light brownish gray (10YR 6/2) mottles; weak fine subangular blocky structure; few fine roots; thin continuous clay films; 10 percent shale and sandstone fragments as much as 1 inch in diameter; very strongly acid; clear smooth boundary.

Bx—26 to 42 inches, strong brown (7.5YR 5/6) silt loam; common medium distinct light brownish gray (10YR 6/2) mottles; weak thick platy structure parting to weak fine subangular blocky; firm, brittle; few fine roots; 10 percent shale and sandstone fragments as much as 1 inch in diameter; very strongly acid; gradual wavy boundary.

C—42 to 60 inches, strong brown (7.5YR 5/6) silt loam; common coarse distinct gray (10YR 5/1) mottles; massive; 15 percent shale and sandstone fragments as much as 1 inch in diameter; strongly acid.

The solum thickness ranges from 40 to 60 inches. Depth to bedrock is more than 5 feet. Depth to the fragipan ranges from 22 to 28 inches. Coarse fragments of mainly shale and sandstone make up 5 to 20 percent of the solum and 5 to 30 percent of the substratum.

The A1 horizon has value of 3 and chroma of 1 or 2. The A2 and Ap horizons have value of 4 or 5 and chroma of 2 through 4.

The Bt and Bx horizons have hue of 10YR and 7.5YR, value of 4 through 6, and chroma of 3 through 6. Gray and brown mottles are common. The Bt and Bx horizons are silt loam to light silty clay loam.

The C horizon is silt loam, clay loam, or silty clay loam.

Fluvaquents

Fluvaquents in Augusta County consist of deep, somewhat poorly drained to poorly drained soils that are finer than loamy fine sand in the A and B horizons and have an organic-carbon content that decreases irregularly with depth. The soils formed in alluvial material washed from soils underlain by limestone, shale, and sandstone. Fluvaquents are on flood plains along streams and rivers. Slopes range from 0 to 5 percent.

Fluvaquents commonly are near Udifluvents and Massanetta, Frederick, Christian, Edom, and Chilhowie soils. Fluvaquents are not so well drained as these soils.

Because of the variability of these soils, a typical pedon is not given. The solum ranges from 24 to more than 60 inches. It is underlain in some areas by hard limestone and in other areas by stratified layers of gravel and cobbles. Pebbles and cobblestones make up 0 to 15 percent of the solum. The soils are slightly acid to moderately alkaline.

The A horizon dominantly has hue of 10YR, value of 2 through 5, and chroma of 1 through 4. It ranges from fine sandy loam to silty clay loam and is 4 to 18 inches thick.

The B horizon dominantly has hue of 10YR to 2.5Y, value of 2 through 7, and chroma of 0 through 6. High- and low-chroma mottles are common. The B horizon ranges from friable sandy loam to firm, plastic clay and is 18 to more than 48 inches thick.

The C horizon ranges from loamy sand to clay and gravelly, very gravelly, cobbly, and very cobbly analogues.

Frederick series

The Frederick series consists of clayey, kaolinitic, mesic Typic Paleudults. These very deep, well drained soils formed in the weathered products of dolomitic and cherty

limestone. Frederick soils are on uplands in the limestone valley. Slopes range from 2 to 45 percent.

Frederick soils commonly are near Christian, Edom, Endcav, Bookwood, Shenval, Nixa, and Timberville soils. Frederick soils have a thicker solum than all of these except the Shenval soils. They have fewer oxide concretions and less sand in the subsoil than the Shenval soils, and they have an argillic horizon that is not in the Timberville soils.

Typical pedon of Frederick silt loam in an area of Frederick-Christian silt loams, 2 to 7 percent slopes, eroded, 3 miles southwest of Waynesboro, at junction of U. S. 340 and Interstate 64:

Ap—0 to 7 inches, brown (10YR 4/3) silt loam; weak fine granular structure; soft, friable; common fine and medium roots; common fine pores; less than 2 percent chert fragments less than 1 centimeter in diameter; common clean fine sand grains; strongly acid; clear smooth boundary.

B1t—7 to 14 inches, strong brown (7.5YR 5/6) silty clay loam; common medium distinct light yellowish brown (10YR 6/4) coatings on peds and common medium distinct yellowish brown (10YR 5/4) streaks; moderate fine subangular blocky structure; hard, friable; slightly sticky, slightly plastic; common fine and medium roots; common fine pores; few thin patchy yellowish red (5YR 5/6) clay films in voids and pores; less than 2 percent chert fragments as much as 2.5 centimeters in diameter; few clean fine sand grains; very strongly acid; gradual smooth boundary.

B21t—14 to 30 inches, yellowish red (5YR 5/6) clay; common medium distinct brownish yellow (10YR 6/6) mottles; skeletans of thin streaks of sand and silt grains as much as 5 millimeters thick; moderate medium and fine subangular blocky structure; hard, firm; sticky, plastic; few fine and medium roots; few fine and medium pores; thin continuous clay films; less than 2 percent chert fragments as much as 2.5 centimeters in diameter; few clean fine sand grains; very strongly acid; gradual smooth boundary.

B22t—30 to 50 inches, yellowish red (5YR 5/6) clay; few fine distinct reddish yellow (7.5YR 6/6) mottles; moderate medium and fine subangular blocky structure; hard, firm; sticky, plastic; few fine roots; few fine pores; medium continuous clay films; less than 2 percent by volume chert fragments as much as 2.5 centimeters in diameter; very strongly acid; gradual wavy boundary.

B3t—50 to 70 inches, yellowish red (5YR 4/6) clay; many medium distinct brownish yellow (10YR 6/6) and reddish yellow (7.5YR 6/6) mottles; moderate very coarse prismatic structure parting to moderate medium angular blocky; hard, firm; sticky, plastic; few fine roots; few very fine pores; many thin patchy clay films; few partial coatings of reddish brown (5YR 4/4); less than 2 percent chert fragments less than 5 centimeters in diameter; very strongly acid.

The solum thickness is 60 to 80 inches or more. Depth to bedrock is 6 to 12 feet or more. Fragments of chert and sandstone make up 0 to 15 percent of the solum.

The A horizon has hue of 5YR through 10YR, value of 4 through 6, and chroma of 1 through 6. It is silty clay loam in severely eroded areas and cherty, very cherty, and rocky analogues of silt loam or silty clay loam.

The Bt horizon has hue of 7.5YR through 2.5YR, value of 4 through 6, and chroma of 6 through 8. Bright colored mottles are common in the lower part. The B1t horizon is clay loam and silty clay loam, and the B2t horizon is clay or silty clay. Common to many thin to thick skeletans are in the upper part of the Bt horizon.

The C horizon, where present, has value of 4 or 5, chroma of 6 through 8, and mottles in shades of brown, yellow, and red. It is silt loam to light clay.

The Frederick soils in this survey area were mapped only with Christian soils or Rock outcrop.

Guernsey series

The Guernsey series consists of fine, mixed, mesic Aquic Hapludalfs. These deep, moderately well drained soils formed in colluvium mostly from uplands underlain by calcareous shale interbedded with lenses of limestone and sandstone. The soils are along drainageways and in upland depressions.

Guernsey soils are commonly near Chilhowie, Edom, Endcav, and Sequoia soils. Guernsey soils are not so well drained as these soils, have a yellower subsoil than the Edom or Sequoia soils, and have a thicker solum than the Chilhowie soils. Guernsey soils have low-chroma mottles in the upper part of the subsoil, which the Endcav soils do not have.

Typical pedon of Guernsey silt loam, 2 to 10 percent slopes, 1 mile north of New Hope, 300 feet west of State route 608, and 1,000 feet southeast of intersection of State routes 608 and 778:

A1—0 to 2 inches, dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

A2—2 to 6 inches, very pale brown (10YR 7/4) silt loam; few coarse distinct yellow (10YR 7/8) mottles; weak fine granular structure; friable; few fine roots; many oxide concretions and stains as much as 1/8 inch thick; very strongly acid; clear wavy boundary.

B1—6 to 13 inches, brownish yellow (10YR 6/6) silty clay loam; many coarse faint very pale brown (10YR 7/4) mottles; weak medium subangular blocky structure; friable; few fine roots; pale olive (5Y 6/3) silt coatings on many ped faces; many oxide concretions as much as 1/4 inch thick; strongly acid; clear smooth boundary.

B21t—13 to 22 inches, yellowish brown (10YR 5/8) silty clay; strong medium subangular blocky structure; firm; slightly sticky and slightly plastic; few fine and coarse roots; thin continuous pale brown (10YR 6/3) clay films; few oxide concretions as much as 1/8 inch thick; few fine shale fragments; slightly acid; clear smooth boundary.

B22t—22 to 35 inches, light yellowish brown (2.5Y 6/4) shaly silty clay loam; many medium distinct yellowish brown (10YR 5/6), light olive gray (5Y 6/2), and light gray (2.5Y 7/2) mottles; weak fine subangular blocky structure; friable; few fine oxide concretions; 30 percent strongly weathered shale fragments; neutral; gradual irregular boundary.

B3—35 to 40 inches, light yellowish brown (2.5Y 6/4) and brownish yellow (10YR 6/6) very shaly silty clay loam; many coarse pale olive (5Y 6/3) and light olive gray (5Y 6/2) mottles; weak fine granular structure; friable; 50 percent shale fragments; mildly alkaline; clear irregular boundary.

C—40 to 60 inches, yellowish brown (10YR 5/6) and light yellowish brown (2.5Y 6/4) strongly weathered calcareous shale containing lenses of silty clay loam soil material between shale fragments.

R—60 inches, hard calcareous shale.

The solum is 40 to 60 inches thick. Depth to bedrock is 5 feet or more. Shale and sandstone fragments as much as 6 inches thick make up 0 to 20 percent of the A horizon and upper part of the B horizon and 0 to 35 percent of the lower part of the B horizon.

The A horizon has hue of 10YR, value of 3 through 7, and chroma of 2 through 4.

The B horizon has hue of 10YR, 2.5Y, and 7.5YR, value of 4 through 6, and chroma of 4 through 8. High-chroma mottles are in the upper part of the B horizon. Low-chroma mottles are in the lower part of the B horizon commonly at a depth of more than 22 inches.

Hartleton series

The Hartleton series consists of loamy-skeletal, mixed, mesic Typic Hapludults. These deep, well drained soils formed in residuum from weakly metamorphosed acid sandstone and shale. The Hartleton soils are on ends and tops of ridges and on the upper side slopes of the Blue Ridge Mountains. Slopes range from 15 to 75 percent.

Hartleton soils commonly are near Cataska, Hazleton, and Lew soils. Hartleton soils have a thicker solum and are deeper to bedrock than the Cataska soils, have more silt and less sand throughout the solum than the Hazleton soils, and have a thinner solum and are shallower to bedrock than the Lew soils.

Typical pedon of Hartleton channery loam in an area of Hartleton soils, 25 to 75 percent slopes, in George Washington National Forest, 300 yards southeast of Mine Bank Mountain west of Blue Ridge Parkway:

O1—2 inches to 0, undecomposed and partially decomposed leaves and twigs.

A1—0 to 2 inches, dark grayish brown (10YR 4/2) channery loam; weak fine granular structure; friable; 35 percent sandstone and shale fragments; many fine roots; very strongly acid; clear smooth boundary.

A2—2 to 6 inches, yellowish brown (10YR 5/6) channery loam; weak fine subangular blocky structure; friable; many fine roots; 35 percent sandstone and shale fragments; very strongly acid; clear smooth boundary.

B21t—6 to 13 inches, yellowish brown (10YR 5/6) channery heavy loam; weak fine subangular blocky structure; friable; many fine and medium roots; faint patchy clay films on peds; 35 percent sandstone and shale fragments; very strongly acid; clear smooth boundary.

B22t—13 to 25 inches, yellowish brown (10YR 5/6) channery light clay loam; weak fine subangular blocky structure; friable; common fine and medium roots; faint patchy clay films on peds; 45 percent sandstone and shale fragments; very strongly acid; clear smooth boundary.

B23t—25 to 33 inches, yellowish brown (10YR 5/6) very channery light clay loam; weak moderate subangular blocky structure; friable; few fine roots; faint patchy clay films on peds; 50 percent sandstone and shale fragments; very strongly acid; clear wavy boundary.

C—33 to 50 inches, yellowish brown (10YR 5/6) very channery heavy silt loam; massive; friable; few fine roots; 75 percent sandstone and shale fragments; very strongly acid.

R—50 inches, hard sandstone and shale.

The solum thickness ranges from 20 to 40 inches. Depth to bedrock ranges from 40 to 60 inches. Coarse fragments of angular sandstone and shale make up 20 to 40 percent of the A horizon and 30 to 80 percent of the B and C horizons.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 through 6. It is channery loam, very channery loam, stony loam, and very stony loam.

The B2t horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 through 6. It is channery or very channery loam or light clay loam.

The C horizon is very channery loam and light clay loam.

Hazleton series

The Hazleton series consists of loamy-skeletal, mixed, mesic Typic Dystrochrepts. These deep, well drained soils formed in material weathered from acid sandstone. The Hazleton soils are on ridges and side slopes of mountains. Slopes range from 7 to 70 percent.

Hazleton soils commonly are near Berks, Drall, Hartleton, Leetonia, and Lehew soils. Hazleton soils are deeper to bedrock than the Berks and Lehew soils, contain less sand in the subsoil than the Drall soils, do not have the Bt

horizon of the Hartleton soils, and do not have the spodic horizon of the Leetonia soils.

Typical pedon of Hazleton sandy loam in an area of Hazleton soils, 25 to 70 percent slopes, in George Washington National Forest, 4 miles north of Stokesville, 1/4 mile west of intersection of Forest Service road 101 and Hearthstone Lake road:

O1—1 inch to 0, undecomposed and partially decomposed leaves and twigs.
A1—0 to 3 inches, dark yellowish brown (10YR 4/4) sandy loam; weak medium granular structure; very friable; 15 percent sandstone fragments less than 3 inches in diameter; many fine roots; very strongly acid; abrupt wavy boundary.
A2—3 to 10 inches, yellowish brown (10YR 5/4) sandy loam; weak coarse granular structure; very friable; 10 percent sandstone fragments less than 3 inches in diameter; many fine and medium roots; very strongly acid; abrupt wavy boundary.
B1—10 to 18 inches, yellowish brown (10YR 5/8) channery fine sandy loam; weak fine subangular blocky structure; very friable; 30 percent sandstone fragments less than 3 inches in diameter; common fine and medium roots; very strongly acid; clear wavy boundary.
B21—18 to 27 inches, yellowish brown (10YR 5/8) channery fine sandy loam; moderate medium subangular blocky structure; friable; 40 percent sandstone fragments less than 3 inches in diameter; few fine roots; very strongly acid; clear wavy boundary.
B22—27 to 42 inches, yellowish brown (10YR 5/6) very channery sandy loam; moderate medium subangular blocky structure; friable; 60 percent sandstone fragments mostly 3 to 10 inches in diameter; few fine roots; very strongly acid; clear wavy boundary.
C—42 to 68 inches, light yellowish brown (10YR 6/4) very channery sandy loam; single grained; very friable; 50 percent sandstone fragments less than 10 inches in diameter; few fine roots; very strongly acid.

The solum thickness ranges from 40 to 50 inches. Depth to bedrock is 4 to more than 6 feet. Coarse fragments of mostly sandstone make up 5 to 60 percent of the surface layer and 35 to 70 percent of the subsoil and substratum.

The A horizon has value of 3 through 5 and chroma of 2 through 4. It is fine sandy loam, sandy loam, channery sandy loam, and very channery sandy loam and their stony, very stony, and extremely stony counterparts.

The B and C horizons have hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 through 8. They are channery or very channery sandy loam or fine sandy loam.

Jefferson series

The Jefferson series consists of fine-loamy, siliceous, mesic Typic Hapludults. These deep, well drained soils formed in colluvial materials washed from soils underlain by acid sandstone and shale. The Jefferson soils are on the lower side slopes of mountains and adjacent colluvial fans. Slopes range from 7 to 25 percent.

Jefferson soils commonly are near Allegheny, Berks, Cotaco, Hazleton, Monongahela, and Weikert soils. Jefferson soils differ from all of these soils by having siliceous mineralogy. Jefferson soils are deeper to bedrock than the Berks and Weikert soils, are finer textured and contain fewer coarse fragments in the subsoil than the Hazleton soils, and are better drained than the Cotaco and Monongahela soils.

Typical pedon of Jefferson cobbly fine sandy loam, 7 to 15 percent slopes, 3/4 mile west-northwest of Summerdean, 100 feet north of State route 603 extended:

O1—2 inches to 1 inch, loose leaves and twigs.
O2—1 inch to 0, black (10YR 2/1) of fine roots, decayed leaves, and twigs.
A1—0 to 1 inch, dark gray (10YR 4/1) fine sandy loam; weak fine granular structure; very friable; many fine roots; 20 to 30 percent angular and rounded sandstone fragments as much as 1 inch in diameter; few sandstone cobblestones as much as 5 inches in diameter; very strongly acid; abrupt smooth boundary.
A2—1 to 13 inches, yellowish brown (10YR 5/6) cobbly fine sandy loam; weak fine granular structure; very friable; many fine and few medium roots; 20 to 25 percent angular and rounded sandstone cobblestones as much as 6 inches in diameter; very strongly acid; clear smooth boundary.
B1—13 to 23 inches, yellowish brown (10YR 5/6) sandy clay loam; weak fine subangular blocky structure; friable; many fine roots; 5 percent angular and rounded sandstone fragments as much as 2 inches in diameter; very strongly acid; gradual smooth boundary.
B21t—23 to 30 inches, yellowish brown (10YR 5/6) clay loam; weak fine subangular blocky structure; friable; few fine roots; thin discontinuous clay films; 5 percent angular and rounded sandstone fragments as much as 1 inch in diameter; very strongly acid; clear smooth boundary.
B22t—30 to 44 inches, strong brown (7.5YR 5/6) clay loam; common medium distinct very pale brown (10YR 7/4) and yellowish red (5YR 5/8) mottles; weak fine subangular blocky structure; friable; few medium roots; thin discontinuous clay films; 5 to 10 percent rounded sandstone fragments as much as 4 inches in diameter; very strongly acid; gradual wavy boundary.
B3—44 to 57 inches, strong brown (7.5YR 5/6) clay loam; common coarse distinct red (2.5YR 4/8) and brownish yellow (10YR 6/8) mottles; weak fine subangular blocky structure; friable; few fine roots; thin discontin-

uous clay films; 2 percent rounded sandstone fragments as much as 1/2 inch in diameter; few sandstone cobbles as much as 10 inches in diameter; very strongly acid; clear smooth boundary.

C—57 to 65 inches, strong brown (7.5YR 5/6) very cobbly clay loam; common coarse distinct red (2.5YR 4/8) and brownish yellow (10YR 6/8) mottles; massive; friable; 70 percent sandstone pebbles and cobblestones; very strongly acid.

The solum ranges from 40 to 60 inches thick. Depth to bedrock is more than 5 feet. Pebbles and cobblestones make up 20 to 50 percent of the surface layer, 5 to 30 percent of the subsoil, and 50 to 70 percent of the substratum.

The A horizon has value of 4 through 6 and chroma of 3 through 6.

The B2t horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 6 or 8. Brown, red, and yellow mottles are common in the lower part of the Bt horizon. The B2t horizon is loam, sandy clay loam, and clay loam.

The C horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 through 6. Mottles are common. The C horizon is fine sandy loam, loam, sandy clay loam, and clay loam and their very gravelly or very cobbly counterparts.

Leetonia series

The Leetonia series consists of sandy-skeletal, siliceous, mesic Entic Haplorthods. These deep, well drained to excessively drained soils formed in siliceous materials weathered mainly from sandstones, quartzite, and conglomerates. The Leetonia soils are on broad ridges and side slopes. Slopes range from 7 to 45 percent.

Leetonia soils commonly are near Hazleton and Lehew soils. Leetonia soils have a spodic horizon which the Hazleton and Lehew soils do not have. Leetonia soils are coarser textured than the Hazleton soils and are yellower than the Lehew soils.

Typical pedon of Leetonia gravelly loamy sand in an area of Leetonia very stony loamy sand, 7 to 15 percent slopes, in George Washington National Forest, near Forest Service trail on Flint Mountain:

O1—5 to 3 inches, partially decomposed leaves, pine needles, and twigs.

O2—3 inches to 0, black (10YR 2/1) partially decomposed fibrous material of organic matter.

A1—0 to 3 inches, dark gray (10YR 4/1) gravelly loamy sand; weak coarse granular structure; very friable; many fine and medium roots; 25 percent quartzite pebbles and cobblestones; 15 percent stones; extremely acid; abrupt wavy boundary.

A2—3 to 7 inches, light gray (10YR 6/1) gravelly loamy sand; weak coarse granular structure; very friable; few fine and medium roots; 40 percent quartzite pebbles and cobblestones; 15 percent stones; extremely acid; abrupt wavy boundary.

B21h—7 to 11 inches, dark brown (7.5YR 4/3) gravelly loamy sand; moderate coarse granular structure; very friable; many fine and medium roots; 40 percent quartzite pebbles and cobblestones; 10 percent stones; extremely acid; abrupt wavy boundary.

B22h—11 to 15 inches, dark brown (7.5YR 4/4) gravelly loamy sand; moderate medium granular structure; very friable; many fine and medium roots; 35 percent quartzite pebbles and cobblestones; very strongly acid; clear wavy boundary.

B3—15 to 20 inches, brownish yellow (10YR 6/6) very gravelly sand; single grained; loose; few fine roots; 50 percent quartzite pebbles and cobblestones; very strongly acid; clear wavy boundary.

C—20 to 45 inches, olive yellow (2.5Y 6/6) very gravelly sand; single grained; loose; few fine roots; 50 percent quartzite pebbles and cobblestones; very strongly acid; diffuse irregular boundary.

R—45 inches, grayish hard quartzite.

The solum thickness ranges from 17 to 34 inches. Depth to bedrock is 40 to 48 inches. Coarse fragments of quartzite or sandstone make up 35 to 65 percent, by volume, of the control section. These soils are gravelly or very gravelly sand, loamy sand, or loamy fine sand throughout the profile.

The A1 horizon has hue of 10YR through 5YR, value of 2 through 4, and chroma of 1 or 2. The A2 horizon has value of 5 or 6 and chroma of 1.

The Bh horizon has hue of 10YR through 5YR, value of 3 or 4, and chroma of 3 through 6.

The B3 and C horizons have hue of 7.5YR or 10YR, ranging to 2.5Y for the C horizon, value of 5 or 6, and chroma of 4 through 6.

Lehew series

The Lehew series consists of loamy-skeletal, mixed, mesic Typic Dystrochrepts. These moderately deep, well drained to excessively drained soils formed in the weathered products of interbedded reddish sandstone, siltstone, and shale. Lehew soils are on mountainsides and mountaintops. Slopes range from 7 to 70 percent.

Lehew soils are commonly near Berks, Hazleton, and Leetonia soils. Lehew soils are coarser textured than the Berks soils, are redder and shallower to bedrock than the Hazleton soils, and are finer textured than the Leetonia soils and do not have a spodic horizon.

Typical pedon of Lehew flaggy fine sandy loam, 25 to 45 percent slopes, in George Washington National Forest, 1/2 mile from the North River Campgrounds on the Hankey Mountain Trail:

O1—1 inch to 0, partially decomposed leaves and twigs.

A1—0 to 2 inches, dark brown (7.5YR 3/2) flaggy fine sandy loam; weak fine granular structure; very friable;

many fine and medium roots; 20 percent sandstone fragments less than 3 inches in diameter; extremely acid; abrupt wavy boundary.

A2—2 to 7 inches, reddish brown (5YR 4/4) channery fine sandy loam; weak medium granular structure; very friable; many fine and medium roots; 35 percent sandstone and shale fragments less than 6 inches in diameter; very strongly acid; clear wavy boundary.

B21—7 to 15 inches, yellowish red (5YR 4/6) channery loam; weak fine subangular blocky structure; very friable; common roots; 25 percent shale and sandstone fragments less than 3 inches in diameter; very strongly acid; clear wavy boundary.

B22—15 to 26 inches, yellowish red (5YR 4/6) very channery fine sandy loam; weak fine subangular blocky structure; very friable; few fine roots; 60 percent shale and sandstone fragments less than 3 inches in diameter; very strongly acid; abrupt wavy boundary.

C—26 to 32 inches, reddish brown (5YR 4/4) very flaggy fine sandy loam; massive; friable; few fine roots; 70 percent shale and sandstone fragments 3 to 6 inches in diameter; very strongly acid.

R—32 inches, fractured red sandstone.

The solum thickness ranges from 15 to 30 inches. Depth to bedrock ranges from 20 to 40 inches. Sandstone and shale fragments as much as 6 inches in diameter make up 10 to 30 percent of the A horizon, 25 to 60 percent of the B horizon, and 35 to 70 percent of the C horizon.

The A horizon has hue of 7.5YR or 5YR, value of 3 through 5, and chroma of 1 through 4. It is fine sandy loam and channery phases.

The B horizon has value of 4 or 5 and chroma of 4 through 6. It is channery or very channery, flaggy or very flaggy loam, sandy loam, or fine sandy loam.

The C horizon has value of 4 or 5 and chroma of 3 or 4. It is channery or very channery, flaggy or very flaggy loam, sandy loam, or fine sandy loam.

Lew series

The Lew series consists of loamy-skeletal, mixed, mesic Typic Hapludults. These deep, well drained soils formed in colluvium from materials weathered from greenstone or other basic rocks. The Lew soils are on upper Blue Ridge Mountain side slopes. Slopes range from 7 to 70 percent.

Lew soils commonly are near Cataska and Hartleton soils. Lew soils have a thicker solum than these soils and are deeper to bedrock.

Typical pedon of Lew channery silt loam in an area of Lew very stony silt loam, 7 to 25 percent slopes, in George Washington National Forest, 18 miles south of Rockfish Gap, on Blue Ridge Parkway, 0.2 mile west of mile post, 300 feet north of road:

O1—1 inch to 0, undecomposed and partially decomposed leaves and twigs.

A1—0 to 5 inches, dark brown (7.5YR 3/2) channery silt loam; weak fine granular structure; friable; many fine and medium roots; 40 percent greenstone fragments; very strongly acid; clear smooth boundary.

A2—5 to 11 inches, dark brown (7.5YR 4/4) channery silt loam; moderate coarse granular structure; friable; many fine and medium roots; 40 percent greenstone fragments; very strongly acid; clear wavy boundary.

B21t—11 to 21 inches, dark brown (7.5YR 4/4) channery light silty clay loam; moderate fine subangular blocky structure; friable; sticky, plastic; faint patchy clay films on peds; common fine roots; 40 percent greenstone fragments; very strongly acid; clear wavy boundary.

B22t—21 to 31 inches, strong brown (7.5YR 5/6) very channery silty clay loam; moderate fine subangular blocky structure; friable; sticky, slightly plastic; faint patchy clay films on peds; common fine roots; 50 percent greenstone fragments; very strongly acid; clear wavy boundary.

IIB3t—31 to 72 inches, yellowish red (5YR 5/8) very channery light silty clay loam; weak fine subangular blocky structure; friable; few fine roots; faint patchy clay films on peds; 50 percent greenstone fragments; strongly acid.

The solum thickness ranges from 40 to 80 inches or more. Depth to bedrock is more than 60 inches. Coarse fragments of mainly greenstone channers, flags, and pebbles make up 35 to 70 percent of the solum.

The A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 through 4.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 through 8. The IIBt horizon, where present, has hue of 5YR. The Bt and IIBt horizons are channery or very channery silty clay loam or clay loam.

Massanetta series

The Massanetta series consists of fine-loamy, carbonatic, mesic Fluvaquentic Hapludolls. These deep, moderately well drained soils formed in alluvium from soils underlain by limestone and calcareous shale. The Massanetta soils are on small, narrow flood plains that are generally below springs flowing from limestone bedrock. Slopes range from 0 to 2 percent.

Massanetta soils commonly are near Udifluvents and Timberville, Frederick, and Berks soils. Massanetta soils contain a mollic epipedon and secondary lime concretions which all of these other soils do not have. The Timberville soils are browner than Massanetta soils, the Frederick soils are redder, and the Berks soils are shallower and have coarse fragments of shale.

Typical pedon of Massanetta silt loam on stream bank 560 feet north of intersection of State routes 652 and 654:

Ap—0 to 9 inches, very dark gray (10YR 3/1) silt loam; moderate fine granular structure; very friable; many fine roots; few secondary lime concretions as much

as 7 millimeters thick; calcareous; moderately alkaline; clear smooth boundary.

B1g—9 to 31 inches, dark gray (10YR 4/1) silt loam; weak medium subangular blocky structure parting to weak fine granular; friable; few fine roots; many very fine pores; many secondary lime concretions as much as 5 millimeters thick; calcareous; moderately alkaline; gradual smooth boundary.

B2g—31 to 44 inches, gray (10YR 5/1) light silty clay loam; few medium distinct yellowish brown (10YR 5/6) mottles in lower part of horizon; weak fine and medium subangular blocky structure; friable; few fine roots; many fine and medium pores; few root channels coated with dark grayish brown (10YR 4/2) soil material; many secondary lime concretions as much as 4 millimeters thick; few snail shells as much as 20 millimeters in diameter; calcareous; moderately alkaline; gradual smooth boundary.

IIC1—44 to 56 inches, mottled yellowish brown (10YR 5/6) and gray (10YR 5/1) clay; massive; firm; sticky and plastic; few very fine roots; common fine and medium pores; some rounded chert fragments as much as 2-1/2 centimeters thick; calcareous; moderately alkaline; clear smooth boundary.

IIC2g—56 to 74 inches, light gray to gray (10YR 6/1) silty clay; many medium distinct light yellowish brown (2.5Y 6/4), yellowish brown (10YR 5/6), and grayish brown (10YR 5/2) mottles; massive; firm; sticky and plastic; common fine and medium pores; few old root channels with grayish brown (10YR 5/2) coatings; few rounded chert fragments as much as 2-1/2 centimeters thick; calcareous; moderately alkaline; abrupt wavy boundary.

R—74 inches, limestone.

The solum thickness ranges from 20 to 40 inches. Depth to bedrock is more than 5 feet. Coarse fragments of secondary lime concretions and shells make up 0 to 10 percent of the solum and 0 to 20 percent of the substratum.

The A horizon has hue of 10YR, value of 3, and chroma of 1 through 3.

The Bg horizon has hue of 10YR, value of 3 through 6, and chroma of 1 through 4. It is silt loam, loam, silty clay loam, and clay loam.

The IIC horizon has hue of 10YR or 7.5YR, value of 2 through 6, and chroma of 0 through 6. It is loam to clay and their gravelly analogues. Low-chroma mottles are in the B and IIC horizons of some pedons. In some pedons, stratified layers of tufa or sand and gravel are at a depth of more than 30 inches.

Millrock series

The Millrock series consists of mixed, mesic Alfic Udipsamments. These deep, well drained soils formed in alluvium washed from soils underlain by sandstone and limestone. The Millrock soils are on flood plains adjacent to the major streams and rivers. Slopes range from 0 to 4 percent.

Millrock soils commonly are near the Buckton, Chavies, Wheeling, Tioga, and Craigsville soils. Millrock soils are sandier than these soils. They do not have the free carbonates throughout the solum of the Buckton soils, the argillic horizon of the Chavies and Wheeling soils, the cambic B horizon of the Tioga and Craigsville soils, or the high content of coarse fragments in the control section of the Craigsville soils.

Typical pedon of Millrock loamy fine sand, 0 to 4 percent slopes, 1/2 mile northwest of Mount Solon, 1,200 feet southeast of North River, 1,400 feet southwest of intersection of State routes 731 and 936:

Ap—0 to 8 inches, dark brown (7.5YR 4/2) loamy fine sand; weak fine granular structure; very friable; many fine roots; few pebbles; strongly acid; clear smooth boundary.

B1—8 to 25 inches, dark brown (7.5YR 4/2) loamy fine sand; weak fine granular structure; friable; few fine roots; medium acid; clear smooth boundary.

B2—25 to 43 inches, dark reddish brown (5YR 3/4) loamy sand; weak fine granular structure; very friable; few fine roots; medium acid; clear smooth boundary.

C1—43 to 58 inches, reddish brown (5YR 4/3) loamy sand; single grained; few fine roots; medium acid; gradual smooth boundary.

C2—58 to 104 inches, dark brown (7.5YR 4/4) loamy sand; single grained; very friable; few fine roots; strongly acid.

The solum thickness ranges from 30 to 60 inches. Depth to bedrock is more than 6 feet. Coarse fragments of mainly sandstone pebbles make up 0 to 10 percent of the surface layer and subsoil and 0 to 50 percent of the substratum.

The A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 through 4.

The B and C horizons have hue of 5YR through 10YR, value of 3 or 4, and chroma of 2 through 4. They are loamy fine sand or loamy sand. The B and C horizons have thin lamellae of fine sandy loam.

Monongahela series

The Monongahela series consists of fine-loamy, mixed, mesic Typic Fragiudults. These deep, moderately well drained soils formed in old alluvium from soils derived largely from acid sandstone and shale. The Monongahela soils are on terraces of the major streams and rivers and are adjacent to mountain foot slopes. Slopes range from 0 to 15 percent.

Monongahela soils are commonly near Allegheny, Purdy, Cotaco, and Buchanan soils. Monongahela soils have a fragipan which the Allegheny, Purdy, and Cotaco soils do not have. Monongahela soils are better drained

than the Purdy and Buchanan soils and are not as well drained as the Allegheny soils.

Typical pedon of Monongahela fine sandy loam, 7 to 15 percent slopes, 1 mile north of Augusta Springs on Virginia Game Commission land, 1,700 feet southwest of intersection of access road and C&O Railroad:

O1—3 to 1 inch, loose leaves and twigs.

O2—1 inch to 0, very dark brown (10YR 2/2) partially decayed organic matter with many fine roots.

A1—0 to 1 inch, dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; few sandstone cobblestones and pebbles; extremely acid; abrupt smooth boundary.

A2—1 to 9 inches, yellowish brown (10YR 5/6) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; 5 to 10 percent sandstone cobblestones; very strongly acid; clear smooth boundary.

B1—9 to 17 inches, yellowish brown (10YR 5/6) light sandy clay loam; weak fine subangular blocky structure; few fine roots; friable; 5 percent sandstone pebbles; very strongly acid; clear smooth boundary.

B2t—17 to 28 inches, yellowish brown (10YR 5/6) sandy clay loam; few thin very pale brown (10YR 7/3) streaks; moderate fine subangular blocky structure; friable; few fine roots; thin patchy clay films; 2 percent sandstone pebbles and cobblestones; very strongly acid; abrupt smooth boundary.

Bx1—28 to 36 inches, yellowish brown (10YR 5/6) sandy clay loam; common fine and medium distinct strong brown (7.5YR 5/8) and light gray (10YR 7/2) mottles; weak thick platy structure parting to weak fine subangular blocky; firm and slightly brittle; few thin patchy clay films; 3 percent sandstone pebbles; very strongly acid; clear wavy boundary.

Bx2—36 to 53 inches, yellowish brown (10YR 5/6) gravelly light sandy clay loam; many fine and medium distinct strong brown (7.5YR 5/6) and very pale brown (10YR 7/3) mottles; weak thick platy structure; firm and brittle; 25 percent sandstone pebbles; very strongly acid; clear smooth boundary.

C—53 to 62 inches, mixed yellowish brown (10YR 5/6), strong brown (7.5YR 5/6), and light brownish gray (10YR 6/2) light clay loam; massive; firm; few yellowish brown (10YR 5/4) clay flows; very strongly acid.

The solum is 40 to 60 inches thick. Depth to bedrock is more than 5 feet. Depth to the fragipan ranges from 20 to 30 inches. Sandstone pebbles and cobblestones make up 0 to 25 percent of the solum and 0 to 35 percent of the substratum.

The A horizon has value of 4 or 5 and chroma of 2 through 4. It is cobbly fine sandy loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 through 8. Low-chroma mottles are in the lower part of the Bt horizon in some pedons. The Bt horizon is light clay loam, sandy clay loam, or heavy loam.

The Bx horizon has hue of 10YR or 2.5Y, value of 5, and chroma of 4 through 6. Mottles are common to many. The Bx horizon is fine sandy loam, heavy loam, light clay loam, or light sandy clay loam.

The IIBt horizon, where present, has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 5 or 6. Mottles are common to many. The IIBt horizon is heavy clay loam or clay.

The C horizon, where present, has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 2 through 6. The C horizon is clay loam or clay with gravelly and cobbly analogues. Some pedons are underlain by stratified layers of sand, silt, pebbles, or cobblestones.

Nixa series

The Nixa series consists of loamy-skeletal, siliceous, mesic Glossic Fragiudults. These deep, moderately well drained soils formed in colluvial material washed from soils derived from cherty limestone. The Nixa soils are at the base and along the lower slopes of cherty knolls and ridges.

Nixa soils commonly are near Frederick and Christian soils. Nixa soils do not have the red clayey subsoil of the Frederick and Christian soils and have a fragipan that is not in those soils.

Typical pedon of Nixa very cherty silt loam, 2 to 15 percent slopes, 1-1/2 miles east of New Hope, on north side of State route 617, and 80 feet west of intersection of State routes 617 and 783:

O2—1 inch to 0, dark gray (10YR 4/1) strongly decomposed organic material.

A1—0 to 1 inches, gray (10YR 5/1) silt loam; weak fine granular structure; friable; many fine roots; very strongly acid; abrupt smooth boundary.

A21—1 to 12 inches, pale brown (10YR 6/3) very cherty silt loam; weak fine granular structure; friable; many fine roots; 50 percent chert fragments as much as 6 inches thick; very strongly acid; clear smooth boundary.

A22—12 to 15 inches, very pale brown (10YR 7/3) very cherty silt loam; weak fine subangular blocky structure; friable; few fine roots; 50 percent chert fragments as much as 1/4 inch thick; very strongly acid; clear smooth boundary.

Bxt—15 to 34 inches, light yellowish brown (10YR 6/4) very cherty silt loam; many coarse faint very pale brown (10YR 7/3) and light gray (10YR 7/1) mottles; massive; firm; brittle; 55 percent chert fragments as much as 4 inches thick; very strongly acid; gradual wavy boundary.

B2t—34 to 40 inches, dark yellowish brown (10YR 4/4) cherty silty clay loam; many distinct light gray (10YR 7/1) mottles; weak fine subangular blocky structure; friable; thin discontinuous clay films; 40 percent chert

fragments as much as 4 inches thick; very strongly acid; clear smooth boundary.

B3—40 to 64 inches, brownish yellow (10YR 6/6) cherty silt loam; many coarse distinct very pale brown (10YR 7/4) and light gray (10YR 7/1) mottles; weak thin platy structure; friable; 40 percent chert fragments as much as 4 inches thick; very strongly acid.

The solum thickness is 40 to 70 inches. Depth to bedrock is more than 6 feet. Chert fragments make up 50 to 60 percent of the surface layer and 35 to 70 percent of the subsoil and fragipan. Mottles with chroma of 2 or less are common in the B horizon of most areas of this soil.

The A horizon has value of 3 through 6 and chroma of 1 through 4.

The Bx horizon has value of 5 through 7 and chroma of 1 through 8. It is cherty silt loam or very cherty silt loam.

The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 through 8. It is cherty silt loam, cherty silty clay loam, very cherty silt loam, and very cherty silty clay loam.

Opequon series

The Opequon series consists of clayey, mixed, mesic Lithic Hapludalfs. These shallow, well drained soils formed in material weathered from relatively pure limestone. The Opequon soils are on side slopes of ridges in the limestone valley. Slopes range from 7 to 45 percent.

Opequon soils commonly are near Chilhowie, Bookwood, and Frederick soils. Opequon soils are shallower to bedrock than those soils.

Typical pedon of Opequon silty clay loam in an area of Opequon-Rock outcrop complex, 7 to 45 percent slopes, 1 mile south of Mount Pisgah Church, 400 feet east of intersection of State routes 626 and 781:

Ap—0 to 3 inches, dark yellowish brown (10YR 4/4) silty clay loam; weak fine granular structure; very friable; many fine roots; few limestone fragments as much as 3 inches in diameter; neutral; abrupt smooth boundary.

B1—3 to 6 inches, reddish brown (5YR 4/4) silty clay loam; weak fine subangular blocky structure; friable, slightly sticky; common fine roots; few oxide concretions; 5 percent limestone fragments as much as 5 inches in diameter; neutral; clear wavy boundary.

B2t—6 to 13 inches, yellowish red (5YR 4/6) clay; strong fine blocky structure; firm, sticky, plastic; few fine roots; thin continuous clay films; few oxide concretions; 5 percent limestone fragments as much as 6 inches in diameter; moderately alkaline; abrupt smooth boundary.

R—13 inches; hard dark gray limestone.

The solum thickness and depth to bedrock range from 12 to 18 inches. Coarse fragments of mostly limestone make up 0 to 30 percent of the solum.

The A horizon has hue of 10YR or 7.5YR, value of 4, and chroma of 2 through 4.

The B horizon has hue of 7.5YR through 2.5YR, value of 4, and chroma of 2 through 6.

The Opequon soils in this survey area are mapped only with Rock outcrop.

Philo series

The Philo series consists of coarse-loamy, mixed, mesic Fluvaquentic Dystrochrepts. These deep, moderately well drained soils formed in materials washed from soils underlain by acid sandstone and shale. Philo soils are on flood plains generally along rivers adjacent to mountain foot slopes. Slopes range from 0 to 2 percent.

Philo soils commonly are near Atkins, Chavies, Craigsville, and Tioga soils. Philo soils are better drained than the Atkins soils; are not so well drained as the Chavies, Craigsville, and Tioga soils; have a browner subsoil than the Atkins soils; and have low-chroma mottles within 24 inches of the surface, which the Chavies, Craigsville, and Tioga soils do not have.

Typical pedon of Philo silt loam, 1-1/2 miles southwest of Crimora, 1,700 feet west of intersection of State route 619 and N&W Railroad:

Ap—0 to 7 inches, very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; friable; many fine roots, few rounded sandstone fragments as much as 1/2 inch thick; medium acid; clear smooth boundary.

B1—7 to 14 inches, yellowish brown (10YR 5/4) fine sandy loam; weak fine granular structure; friable; few fine roots; common old root and worm channels filled with material from Ap horizon; common worm channels and casts; strongly acid; clear smooth boundary.

B21—14 to 19 inches, yellowish brown (10YR 5/4) sandy loam; weak fine subangular blocky structure; friable; few fine roots; old root channels filled with material from Ap horizon; few worm channels; very strongly acid; clear smooth boundary.

B22—19 to 24 inches, yellowish brown (10YR 5/4) fine sandy loam; few fine distinct light gray (10YR 7/2) mottles; weak fine subangular blocky structure; friable; few fine roots; few old root channels filled with material from Ap horizon; few sandstone cobblestones as much as 4 inches in diameter; very strongly acid; abrupt smooth boundary.

B3—24 to 33 inches, pale brown (10YR 6/3) sandy loam; common coarse distinct strong brown (7.5YR 5/6) and few fine faint light brownish gray (10YR 6/2) mottles; weak fine and medium subangular blocky structure; friable; 5 to 10 percent rounded sandstone fragments as much as 1 inch in diameter; very strongly acid; gradual smooth boundary.

IIC1—33 to 49 inches, pale brown (10YR 6/3) and strong brown (7.5YR 5/6) gravelly loamy fine sand; few fine distinct strong brown (7.5YR 5/6) and light brownish

gray (10YR 6/2) mottles; single grained; friable; 20 to 25 percent rounded sandstone fragments as much as 3 inches in diameter; very strongly acid; gradual smooth boundary.

IIC2—49 to 60 inches, pale brown (10YR 6/3) and strong brown (7.5YR 5/6) very cobbly loamy fine sand; few fine distinct strong brown (7.5YR 5/6) and light brownish gray (10YR 6/2) mottles; single grained; friable; 50 to 60 percent sandstone cobblestones as much as 6 inches in diameter; strongly acid; gradual smooth boundary.

The solum thickness ranges from 20 to 40 inches. Depth to bedrock is more than 5 feet. Coarse fragments of mainly sandstone make up 0 to 10 percent of the solum and 20 to 60 percent of the substratum.

The A horizon has value of 3 or 4 and chroma of 2 or 3.

The B horizon has value of 4 through 6 and chroma of 3 or 4. Low-chroma mottles are in the B horizon between depths of 16 and 20 inches. The B horizon is fine sandy loam, sandy loam, and loam.

The C horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 2 or 3. It is loamy fine sand or loamy sand and their gravelly, very gravelly, cobbly, and very cobbly counterparts.

Purdy series

The Purdy series consists of clayey, mixed, mesic Typic Ochraquults. These deep, poorly drained soils formed in alluvium from sandstone, shale, and some limestone. The soils are in depressions and along drainageways on terraces. Slopes range from 0 to 2 percent.

Purdy soils commonly are near Buchanan, Monongahela, and Cotaco soils. Purdy soils are not so well drained as these soils and do not have the fragipan of the Buchanan and Monongahela soils.

Typical pedon of Purdy silt loam, 3/4 mile southwest of Lyndhurst, 400 feet southeast of State route 624:

Ap—0 to 3 inches, dark gray (10YR 4/1) silt loam; very fine granular structure; friable; common fine and medium roots; very strongly acid; abrupt smooth boundary.

B1tg—3 to 8 inches, dark gray (10YR 4/1) silty clay; few fine faint yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; plastic and slightly sticky; common fine and medium roots; thin patchy clay films; very strongly acid; gradual smooth boundary.

B21tg—8 to 27 inches, gray (10YR 6/1) clay; common medium distinct yellowish brown (10YR 5/8) and brownish yellow (10YR 6/6) mottles; moderate fine subangular blocky structure; firm; sticky and plastic; few fine roots; thin continuous clay films; some sandstone fragments as much as 1/2 inch in diameter; very strongly acid; clear wavy boundary.

B22tg—27 to 43 inches, gray (10YR 6/1) silty clay loam; many coarse distinct yellowish brown (10YR 5/8) and brownish yellow (10YR 6/6) mottles; common fine distinct red (2.5YR 4/8) mottles; weak fine subangular blocky structure; friable; few fine roots; thin patchy clay films; 10 to 15 percent rounded sandstone fragments as much as 5 inches in diameter; very strongly acid; gradual wavy boundary.

B3t—43 to 50 inches, red (2.5YR 4/8) and yellowish brown (10YR 5/8) cobbly silty clay loam; streaks and pockets of gray (10YR 6/1) clay; weak fine subangular blocky structure; friable; few fine roots; thin patchy clay films; 25 to 30 percent rounded sandstone fragments as much as 6 inches in diameter; very strongly acid; gradual wavy boundary.

C—50 to 60 inches, mottled yellowish red (5YR 5/8), yellowish brown (10YR 5/6), red (2.5YR 4/8), and gray (10YR 6/1) very cobbly light silty clay loam; weak very fine subangular blocky structure; friable; 60 percent rounded sandstone fragments as much as 15 inches in diameter; very strongly acid.

The solum is 28 to 50 inches thick. Depth to bedrock is more than 5 feet.

The A horizon has hue of 2.5Y and 10YR, value of 4 or 5, and chroma of 1 or 2.

The B horizon is neutral or has hue of 10YR through 2.5Y, value of 4 through 6, and chroma of 0 through 2. High-chroma mottles are common in the B horizon.

The C horizon is neutral or has hue of 10YR through 2.5Y, value of 5 or 6, and chroma of 0 through 2. It commonly has high-chroma mottles. In some pedons, the C horizon is stratified sand, gravel, and cobblestones.

Rushtown series

The Rushtown series consists of loamy-skeletal over fragmental, mixed, mesic Typic Dystrochrepts. These deep, well drained soils formed in colluvial material from soils underlain by acid shale and siltstones. The Rushtown soils are on the lower side slopes of mountains. Slopes range from 45 to 80 percent.

Rushtown soils commonly are near Berks and Weikert soils. The Rushtown soils are deeper to bedrock and do not have the cambic B horizon of these soils.

Typical pedon of Rushtown shaly silt loam, 45 to 80 percent slopes, in George Washington National Forest, 1-1/2 miles west of intersection of Forest Service roads 82.1 and 382, near Augusta Springs:

O1—2 inches to 0, undecomposed leaves and twigs and thin dark colored partially decomposed leaf layer.

A1—0 to 4 inches, dark brown (10YR 3/3) shaly silt loam; moderate fine granular structure; friable; many fine and medium roots; 25 percent shale fragments; strongly acid; abrupt smooth boundary.

A2—4 to 10 inches, dark brown (10YR 4/3) shaly silt loam; moderate fine granular structure; friable; many

fine and medium roots; 40 percent shale fragments; very strongly acid; clear smooth boundary.

B21—10 to 17 inches, strong brown (7.5YR 5/6) very shaly silt loam; moderate very fine subangular blocky structure; friable; common fine roots; 65 percent shale fragments; very strongly acid; clear smooth boundary.

B22—17 to 25 inches, strong brown (7.5YR 5/6) very shaly loam; weak fine subangular blocky structure; friable; common fine roots; 75 percent shale fragments; very strongly acid; gradual smooth boundary.

B3—25 to 35 inches, yellowish brown (10YR 5/6) very shaly loam; weak fine subangular blocky structure; friable; common fine roots; 75 percent shale fragments; very strongly acid; clear smooth boundary.

C1—35 to 53 inches, yellowish brown (10YR 5/4) very shaly loam; massive; very friable and loose; few fine roots; 80 percent shale fragments; common unfilled voids; very strongly acid; abrupt smooth boundary.

C2—53 to 60 inches, yellowish brown (10YR 5/6) very shaly loam; many medium distinct strong brown (7.5YR 5/8) and light olive gray (5Y 6/2) mottles; massive; friable and loose; few fine roots; 65 percent shale fragments; common unfilled voids; very strongly acid.

The solum thickness ranges from 20 to 40 inches. Depth to bedrock is more than 5 feet. Shale fragments as much as 3 inches in diameter make up 25 to 75 percent of the solum and as much as 80 percent of the substratum.

The A horizon has value of 3 or 4 and chroma of 2 through 4. It is shaly and very shaly silt loam.

The B and C horizons have hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 through 6. They range from shaly silt loam to very shaly silt loam and loam. High- and low-chroma mottles are in the lower part of the C horizon in some pedons.

Sequoia series

The Sequoia series consists of clayey, mixed, mesic Typic Hapludults. These moderately deep, well drained soils formed in residuum of shale. The Sequoia soils are on ridgetops, knolls, and side slopes of uplands. Slopes range from 2 to 25 percent.

Sequoia soils are commonly near Berks, Weikert, and Guernsey soils. Sequoia soils have a thicker solum than the Berks and Weikert soils and an argillic horizon which these soils do not have. Sequoia soils are better drained and more acid in the lower part of the subsoil than the Guernsey soils.

Typical pedon of Sequoia silt loam, 2 to 7 percent slopes, eroded, 1-3/4 miles east of Mount Sidney, on south side of State route 775, approximately 1 mile west of intersection of State routes 775 and 778:

Ap—0 to 8 inches, yellowish brown (10YR 5/4) silt loam; weak fine granular structure; friable; many grass roots in upper 2 inches; few weathered shale fragments as much as 1/2 inch in diameter; medium acid; abrupt smooth boundary.

B21t—8 to 13 inches, reddish yellow (7.5YR 6/6) clay; moderate fine and medium subangular blocky structure; firm; slightly sticky; few fine roots; discontinuous thin clay films; few brownish yellow (10YR 6/6) silt coatings; approximately 5 percent thin weathered shale fragments as much as 1-1/2 inches in diameter; few worm casts; extremely acid; clear smooth boundary.

B22t—13 to 27 inches, yellowish red (5YR 5/8) clay; strong medium subangular blocky structure; firm; slightly sticky and slightly plastic; few fine roots in upper part; thick continuous yellowish red (5YR 5/6) and strong brown (7.5YR 5/6) clay films; 3 to 5 percent weathered shale fragments as much as 1 inch in diameter; strongly acid; clear wavy boundary.

B3t—27 to 32 inches, yellowish red (5YR 5/6), strong brown (7.5YR 5/6), and yellowish brown (10YR 5/6) shaly clay; weak fine subangular blocky structure interrupted by shale fragments; few thin discontinuous clay films; 50 percent light yellowish brown weathered shale fragments as much as 5 inches in diameter; strongly acid; clear irregular boundary.

C—32 to 34 inches, light yellowish brown strongly weathered shale containing thin lenses and coatings of silt; very strongly acid.

Cr—34 to 60 inches, soft fractured shale with thin silt coatings.

The solum is 20 to 40 inches thick. Depth to hard shale is commonly more than 5 feet. Shale fragments as much as 4 inches in diameter make up 2 to 20 percent of the solum and 40 to 90 percent of the substratum.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 3 through 6.

The B horizon has hue of 10YR, 7.5YR, and 5YR, value of 4 through 6, and chroma of 4 through 8. It is clay and heavy clay loam.

The C horizon is shaly or very shaly silty clay loam and silt loam.

Shenval series

The Shenval series consists of fine, mixed, mesic Typic Paleudalfs. These deep, well drained soils formed in old alluvium washed from uplands underlain by limestone, shale, and some sandstone. Shenval soils are on broad terraces along larger streams. Limestone bedrock commonly underlies this soil. Slopes range from 2 to 25 percent.

Shenval soils are commonly near Frederick, Edom, Allegheny, and Monongahela soils. Shenval soils have a browner surface layer and more sandstone throughout than the Frederick soils, and they have oxide concretions

that are not typical of the Frederick soils. Shenval soils have a thicker solum, have more sandstone, and are deeper to bedrock than Edom soils, and they do not have the shale content typical of the Edom soils. Shenval soils are finer textured than the Allegheny soils. They are better drained than the Monongahela soils, and they do not have a fragipan.

Typical pedon of Shenval loam, 7 to 15 percent slopes, eroded, 4 miles northeast of Greenville, 400 feet northwest of sharp bend in Christians Creek, and 1/2 mile southwest of intersection of State route 652 and U. S. highway 340:

Ap—0 to 9 inches, dark brown (7.5YR 4/4) loam; moderate fine granular structure; friable; many fine roots; 3 percent oxide concretions as much as 1/8 inch in diameter; 5 percent rounded and angular chert and sandstone fragments as much as 2 inches in diameter; medium acid; abrupt smooth boundary.

B1—9 to 15 inches, reddish brown (5YR 4/4) clay loam; moderate fine granular structure; friable; common fine roots; 5 to 10 percent oxide concretions as much as 1/8 inch in diameter; slightly acid; clear smooth boundary.

B21t—15 to 19 inches, reddish brown (5YR 4/4) clay loam; weak fine subangular blocky structure; friable; slightly sticky, plastic; common fine roots; thin patchy clay films; few worm channels and casts; common oxide stains; 10 percent oxide concretions as much as 1/8 inch in diameter; few rounded sandstone and chert fragments as much as 1/4 inch in diameter; slightly acid; clear smooth boundary.

B22t—19 to 30 inches, reddish brown (2.5YR 4/4) heavy clay loam; weak fine subangular blocky structure; friable; sticky, plastic; few fine roots; thin continuous clay films; few worm channels and casts; many oxide stains; 10 to 15 percent oxide concretions as much as 1/4 inch in diameter; few rounded chert and sandstone fragments as much as 1 inch in diameter; slightly acid; clear smooth boundary.

B23t—30 to 53 inches, yellowish red (5YR 4/6) heavy clay loam; moderate fine and medium subangular blocky structure; friable; sticky, plastic; few fine roots; thin continuous clay films; few worm channels and casts; few oxide stains; 15 percent oxide concretions as much as 1/4 inch in diameter; few rounded sandstone and chert fragments as much as 1/2 inch in diameter; slightly acid; gradual smooth boundary.

B24t—53 to 65 inches, yellowish red (5YR 4/6) heavy clay loam; weak fine subangular blocky structure; friable; slightly sticky, plastic; thin continuous clay films; few oxide stains; 5 percent oxide concretions as much as 1/4 inch in diameter; few rounded angular chert fragments as much as 1/4 inch in diameter; medium acid; gradual smooth boundary.

B3t—65 to 76 inches, yellowish red (5YR 5/6) heavy clay loam; common medium distinct yellow (10YR 7/6) and very pale brown (10YR 7/3) mottles; weak fine subangular blocky structure; friable; thin patchy clay films; 3 percent oxide concretions as much as 1/4 inch in diameter; few rounded sandstone fragments as much as 1/2 inch in diameter; strongly acid; clear smooth boundary.

The solum thickness is more than 60 inches. Depth to hard bedrock, which is commonly limestone, is more than 6 feet. Coarse fragments make up 0 to 30 percent of the surface layer and 0 to 20 percent of the subsoil and average less than 5 percent throughout. They generally consist of pebbles or cobblestones in the upper part of the solum and chert fragments in the lower part. Oxide concretions make up 2 to 25 percent of the profile and increase with depth.

The Ap horizon has hue of 10YR through 7.5YR, value of 4 or 5, and chroma of 2 through 6. It is loam and cobbly loam. A B1 horizon is in some profiles.

The B2t horizon has hue of 5YR through 2.5YR, value of 4 through 6, and chroma of 4 through 8. Brown or yellow mottles are common in the lower part. The Bt horizon is clay loam to clay. A IIBt horizon that commonly formed in limestone residuum is in some profiles at a depth of more than 3 feet.

Sherando series

The Sherando series consists of loamy-skeletal, siliceous, mesic Typic Dystrochrepts. These deep, well drained to somewhat excessively drained soils formed in alluvium and colluvium. The soils are on fans, foot slopes, and terrace breaks of mountainous uplands. Slopes range from 2 to 45 percent.

Sherando soils are commonly near Allegheny, Cotaco, Craigsville, and Monongahela soils. Sherando soils do not have the argillic horizon of the Allegheny and Cotaco soils, are not as red in the subsoil as the Craigsville soils, and do not have the fragipan of the Monongahela soils.

Typical pedon of Sherando sandy loam, 2 to 15 percent slopes, 4 miles south of Stuarts Draft in George Washington National Forest, 1/2 mile north of intersection of Forest Service roads 42 and 43, 100 yards west of Service Road 43, on a 270 degree bearing:

O1—1 1/4 inch to 0, undecomposed leaves and twigs.

A1—0 to 2 inches, dark grayish brown (10YR 4/2) sandy loam; weak coarse granular structure; friable; many fine roots; 10 percent pebbles; extremely acid; clear smooth boundary.

A2—2 to 6 inches, pale brown (10YR 6/3) sandy loam; weak coarse granular structure; friable; many fine roots; 10 percent pebbles; very strongly acid; clear wavy boundary.

B1—6 to 15 inches, light yellowish brown (10YR 6/4) gravelly sandy loam; weak fine subangular blocky structure; friable; common fine and medium roots; 20

percent pebbles; very strongly acid; clear wavy boundary.

B2—15 to 30 inches, yellowish brown (10YR 5/6) very gravelly sandy loam; weak medium subangular blocky structure; friable; common fine and medium roots; 55 percent pebbles and cobblestones; very strongly acid; clear wavy boundary.

B3—30 to 45 inches, yellowish brown (10YR 5/8) very gravelly sandy loam; weak fine subangular blocky and weak fine granular structure; friable; common fine roots; 60 percent pebbles and cobblestones; very strongly acid.

C1—45 to 55 inches, yellowish brown (10YR 5/8) very gravelly sandy loam; massive; friable; common fine roots; 70 percent pebbles and cobblestones; strongly acid; clear wavy boundary.

C2—55 to 75 inches, yellowish brown (10YR 5/8) very gravelly loamy sand; massive; very friable; few fine roots; 70 percent pebbles and cobblestones; very strongly acid.

The solum is 30 to 60 inches thick. Depth to bedrock is more than 6 feet. Angular and rounded sandstone and quartzite cobblestones and pebbles make up 20 to 40 percent of the A horizon and 35 to 80 percent of the subsoil and substratum.

The A horizon has hue of 10YR, value of 4 through 6, and chroma of 2 through 4. It is sandy loam, fine sandy loam, or cobbly phases of these.

The B horizon has hue of 7.5YR and 10YR, value of 5 or 6, and chroma of 4 through 8. It is gravelly to very cobbly sandy loam.

The C horizon has hue of 10YR, value of 5 or 6, and chroma of 4 through 8. It is very cobbly or very gravelly sandy loam and loamy sand.

Timberville series

The Timberville series consists of fine-loamy, mixed, mesic Fluventic Dystrochrepts. These deep, well drained soils formed in local alluvium washed from soils derived from limestone, sandstone, and shale. The Timberville soils are in depressions, on colluvial fans, and on narrow flood plains adjacent to small streams. Slopes range from 0 to 7 percent.

Timberville soils are commonly near Frederick, Christian, Edom, and Endcav soils. Timberville soils have a browner, less clayey subsoil than the Frederick, Christian, and Edom soils. Timberville soils have a less clayey, less sticky, and less plastic subsoil than the Endcav soils, and they do not have the argillic horizon typical of all these nearby soils.

Typical pedon of Timberville silt loam, 0 to 7 percent slopes, in pasture 1-1/4 miles northwest of Burketown and 6/10 mile southwest of intersection of route 690 and U. S. Highway 11:

Ap—0 to 9 inches, dark brown (10YR 4/3) silt loam, moderate fine and very fine granular structure; friable; many fine roots; few chert fragments as much as 2 inches in diameter; medium acid; clear smooth boundary.

B1—9 to 13 inches, yellowish brown (10YR 5/4) light silty clay loam; weak fine and medium subangular blocky structure; friable; few fine roots; few chert fragments as much as 2 inches in diameter; many very fine oxide stains; few worm casts; medium acid; clear smooth boundary.

B21—13 to 27 inches, strong brown (7.5YR 5/6) cherty silty clay loam; weak fine and medium subangular blocky structure; friable; few fine roots in upper part; many fine oxide stains and concretions as much as 2 millimeters in diameter; 25 percent rounded and angular chert fragments as much as 3 inches in diameter; medium acid; clear smooth boundary.

IIB22tb—27 to 36 inches, yellowish red (5YR 5/8) silty clay; many coarse distinct red (2.5YR 4/6) and strong brown (7.5YR 5/8) mottles; moderate fine and medium subangular blocky structure; firm; slightly sticky and slightly plastic; thin continuous clay films; few chert fragments; strongly acid; gradual wavy boundary.

IIB3b—36 to 60 inches, yellowish red (5YR 5/8) silty clay; many coarse distinct red (2.5YR 4/8) and reddish yellow (7.5YR 6/6) mottles; weak medium and fine subangular blocky structure with massive pockets; firm; few thin patchy clay films; small concentrations of oxide concretions and stains; few chert fragments; extremely acid.

The solum thickness ranges from 20 to 60 inches or more. Depth to bedrock ranges from 5 to 10 feet or more. Coarse fragments of chert and sandstone that are normally less than 6 inches in diameter make up 0 to 35 percent of the surface layer and 0 to 60 percent of some parts of the subsoil. Stratified layers of chert are in some pedons, generally at a depth of more than 20 inches.

The Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 through 5. The A1 and A2 horizons, where present, have chroma of 0 through 2. The Ap horizon is commonly silt loam or cherty silt loam.

The B1 horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 4 through 8. It is silt loam, loam, silty clay loam, and clay loam and their cherty analogues.

The B2 horizon commonly has hue of 10YR to 7.5YR, value of 4 through 6, and chroma of 4 through 8. It is silt loam, loam, silty clay loam, and clay loam and their cherty analogues.

The IIB2t horizon has hue of 7.5YR to 2.5YR, value of 4 or 5, and chroma of 6 through 8. It has red, yellow, or brown mottles in places and is clay, silty clay, or silty clay loam.

Some areas have an Ab and Bb horizon. The Ab horizon has hue of 10YR or 7.5YR, value of 3 through 5, and

chroma of 2 through 8. The Bb horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 4 through 8. It is silt loam, loam, silty clay loam, and clay loam and their cherty and very cherty analogues.

Tioga series

The Tioga series consists of coarse-loamy, mixed, mesic Dystric Fluventic Eutrochrepts. These deep, well drained soils formed in alluvium washed from soils underlain predominantly by limestone and sandstone. The Tioga soils are on flood plains adjacent to the major streams and rivers. Slopes are commonly 0 to 4 percent.

Tioga soils commonly are near Millrock, Chavies, Craigsville, Buckton, and Wheeling soils. Tioga soils have less sand in the subsoil than the Chavies soils and more sand in the subsoil than the Buckton and Wheeling soils. They do not have the coarse fragments of the Craigsville soils or the free carbonates of the Buckton soils.

Typical profile of Tioga fine sandy loam in pasture approximately 2 miles southwest of Crimora and 3,000 feet west of intersection of N&W Railroad and route 619:

Ap—0 to 9 inches, dark brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable; many fine roots; slightly acid; abrupt smooth boundary.

B1—9 to 17 inches, brown (7.5YR 4/4) loam; weak fine subangular blocky structure; friable; few fine roots; few worm casts and channels; slightly acid; clear wavy boundary.

B2—17 to 30 inches, brown (7.5YR 4/4) loam; weak medium subangular blocky structure; friable; few fine roots; some rounded shale fragments as much as 1/2 inch in diameter; medium acid; clear smooth boundary.

C—30 to 60 inches, brown (7.5YR 4/4) loamy fine sand; common fine distinct pale brown (10YR 6/3) mottles; single grain; loose; few rounded shale and sandstone fragments; medium acid.

The solum thickness ranges from 15 to 30 inches. Sandstone pebbles and cobbles make up 0 to 20 percent of the surface layer and 0 to 5 percent of the subsoil. The substratum in some profiles contains beds of gravel and cobbles at a depth of more than 3-1/2 feet.

The Ap horizon has hue of 10YR and 7.5YR, value of 4, and chroma of 2 through 4.

The B horizon has hue of 10YR and 7.5YR, value of 4, and chroma of 3 or 4. It is loam or fine sandy loam.

The C horizon is typically loamy fine sand but includes loamy sand, fine sandy loam, and loam and their very gravelly or very cobbly counterparts.

Udifluvents

Udifluvents in Augusta County consist of deep, moderately well drained to somewhat poorly drained soils that have no identifiable horizons, an organic-carbon content that decreases irregularly with depth, and a seasonal high water table within 20 inches of the surface. Udifluvents formed in alluvial material washed from soils underlain by limestone, shale, and sandstone. Udifluvents are on narrow flood plains along streams and drainageways. Slopes range from 0 to 3 percent.

Udifluvents commonly are near Fluvaquents and Massanetta, Chilhowie, Edom, Endcav, Christian, and Frederick soils. Udifluvents are better drained than Fluvaquents, do not have the secondary lime concretions of the Massanetta soils, and do not have the clayey subsoil of the Chilhowie, Edom, Endcav, Christian, and Frederick soils.

Because of the variability of these soils, a typical pedon is not given. The solum ranges from 24 to more than 60 inches thick. Depth to bedrock is more than 5 feet. Pebbles make up 0 to 10 percent of the solum and 0 to 50 percent of the substratum. Gravel beds or rock outcrops are at a depth of more than 30 inches in places. The soils are slightly acid to mildly alkaline.

The A horizon dominantly has hue of 10YR, value of 3 or 4, and chroma of 2 through 4. It ranges from silt loam to silty clay loam and is 6 to 14 inches thick.

The B horizon dominantly has hue of 10YR or 2.5Y, value of 3 through 6, and chroma of 2 through 6. High- and low-chroma mottles are common at a depth of more than 18 inches. The B horizon ranges from loam to clay and is 18 to 48 inches thick.

The C horizon ranges from fine sandy loam to clay and their gravelly or very gravelly analogues.

Udorthents

Udorthents in Augusta County consist of deep, well drained soils that do not have a B horizon and that contain more than 35 percent rock fragments throughout the profile. Udorthents formed in alluvium derived chiefly from sandstone, quartzite, phyllite, shale, and greenstone. They are on flood plains along streams generally adjacent to or in mountainous areas. Slopes are commonly 0 to 6 percent but range to 45 percent.

Udorthents commonly are near Craigsville, Chavies, and Millrock soils. Udorthents contain less clay and more coarse fragments than the Craigsville and Chavies soils and more coarse fragments than the Millrock soils.

Because of the variability of these soils, a typical pedon is not given. Depth to bedrock is more than 6 feet. Coarse fragments of mainly sandstone and quartzite pebbles and cobblestones make up 35 to 70 percent of the profile. The soils are strongly acid to very strongly acid.

The A horizon has hue of 5YR through 10YR, value of 4, and chroma of 3. It ranges from loam to sandy loam and their gravelly, very gravelly, cobbly, and very cobbly analogues. The A horizon is 6 to 12 inches thick.

The C horizon dominantly has hue of 5YR through 10YR, value of 4, and chroma of 3 or 4. It ranges from loamy sand to sandy loam and their gravelly, very gravelly, cobbly, and very cobbly analogues.

Unison series

The Unison series consists of clayey, mixed, mesic Typic Hapludults. These deep, well drained soils formed in old alluvium washed from uplands underlain by sandstone and shale. Unison soils are on broad terraces along larger streams. Slopes range from 2 to 45 percent.

Unison soils are commonly near Allegheny, Cotaco, Monongahela, and Frederick soils. Unison soils do not have the fragipan of the Monongahela soils and are better drained than the Cotaco or Monongahela soils. They have a more clayey subsoil than the Allegheny soils and typically have rounded sandstone pebbles and cobblestone on the surface and throughout the profile, which the Frederick soils do not have.

Typical pedon of Unison fine sandy loam, 2 to 7 percent slopes, in nursery stock field on nursery farm, 3/4 mile southeast of Lyndhurst:

Ap—0 to 9 inches, yellowish brown (10YR 5/4) fine sandy loam; weak fine granular structure; friable; many fine and medium roots; few rounded and angular sandstone fragments as much as 3 millimeters in diameter; few worm channels and casts; strongly acid; abrupt wavy boundary.

B1—9 to 17 inches, strong brown (7.5YR 5/6) clay loam; weak fine subangular blocky structure; friable; few fine roots; few rounded sandstone fragments as much as 25 millimeters in diameter; few fine oxide concretions; few worm channels and casts; strongly acid; clear wavy boundary.

B21t—17 to 25 inches, yellowish red (5YR 5/6) heavy clay loam; weak fine subangular blocky structure; friable; slightly sticky and slightly plastic; few fine roots; thin patchy reddish brown (5YR 4/4) clay films; few rounded and angular sandstone fragments as much as 5 millimeters in diameter; few worm channels and casts; very strongly acid; gradual wavy boundary.

B22t—25 to 60 inches, yellowish red (5YR 4/6) clay; common fine distinct dark yellowish brown (10YR 4/4) and dark red (2.5YR 3/6) mottles; moderate fine and medium subangular blocky structure; firm; sticky and plastic; few fine and medium roots; thin continuous dark yellowish brown (10YR 4/4) clay films; few rounded and angular sandstone fragments as much as 25 millimeters in diameter; very strongly acid; clear irregular boundary.

C—60 to 77 inches, yellowish red (5YR 4/6) and strong brown (7.5YR 5/6) very gravelly clay loam; 70 percent sandstone pebbles and cobblestones.

The solum is 40 to 60 inches thick. Depth to bedrock is more than 5 feet. Rounded sandstone pebbles and cobblestones make up 2 to 30 percent of the A horizon, 0 to 20 percent of the B2 horizon, and 10 to 50 percent of the B3 horizon.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is loam, fine sandy loam, or cobbly fine sandy loam.

The B horizon has hue of 5YR and 7.5YR, value of 4 or 5, and chroma of 6 through 8. It is clay or clay loam.

The C horizon has hue of 5YR and 7.5YR, value of 4 or 5, and chroma of 6 through 8. It is gravelly, very gravelly, cobbly, or very cobbly clay loam.

Weikert series

The Weikert series consists of loamy-skeletal, mixed, mesic Lithic Dystrochrepts. These shallow, well drained soils formed in material weathered from acid shale or interbedded shale, siltstone, and sandstone. The Weikert soils are on highly dissected uplands and mountain sides. Slopes range from 7 to 80 percent.

Weikert soils commonly are near Berks, Sequoia, Lehew, and Hazleton soils. Weikert soils are shallower to bedrock than any of these soils. They have less clay in the subsoil than the Sequoia soils, have more yellow than the Lehew soils, and are finer textured than the Hazleton soils.

Typical pedon of Weikert very shaly silt loam, 45 to 80 percent slopes, severely eroded, 1 mile west of Dry Branch Gap and 100 yards north of Dry Branch Road:

O1—1 inch to 0, undecomposed leaves, needles, and twigs covering approximately 50 percent of surface.

A1—0 to 1 inch, dark grayish brown (10YR 4/2) very shaly silt loam; weak fine granular structure; friable; 60 percent shale fragments as much as 2 inches in diameter; many roots; strongly acid; abrupt smooth boundary.

A2—1 to 5 inches, yellowish brown (10YR 5/4) very shaly silt loam; weak coarse granular structure; friable; 50 percent shale fragments as much as 2 inches in diameter; many roots; extremely acid; gradual wavy boundary.

B—5 to 10 inches, yellowish brown (10YR 5/6) very shaly silt loam; weak fine subangular blocky structure; friable; 65 percent shale fragments as much as 5 inches in diameter; common roots; very strongly acid; abrupt wavy boundary.

C—10 to 13 inches, yellowish brown (10YR 5/6) very shaly silt loam; massive; few very fine roots; 75 percent shale fragments as much as 6 inches in diameter; very strongly acid; abrupt smooth boundary.

R—13 inches, yellowish brown and olive shale.

The solum thickness is 7 to 20 inches. Depth to hard shale is 7 to 20 inches. Shale, siltstone, and fine grained sandstone fragments make up 35 to 60 percent of the solum and increase with depth.

The A horizon has value of 3 through 6 and chroma of 2 through 6.

The B and C horizons have value of 5 or 6 and chroma of 4 through 6. They are very shaly or very channery silt loam or loam.

Wheeling series

The Wheeling series consists of fine-loamy, mixed, mesic Ultic Hapludalfs. These deep, well drained soils formed in alluvium washed from soils weathered from limestone, shale, and sandstone. The Wheeling soils are on low terraces adjacent to flood plains. Slopes range from 0 to 15 percent.

Wheeling soils commonly are near Allegheny, Chavies, Monongahela, Unison, and Tioga soils. Wheeling soils contain less sand and a higher base saturation than the Allegheny soils, have less sand and more clay in the profile than the Chavies and Tioga soils, do not have the fragipan of the Monongahela soils, and have more brown and less clay in the subsoil than the Unison soils.

Typical pedon of Wheeling silt loam, 0 to 7 percent slopes, 1-1/2 miles southeast of Knightly Mills, 1-1/4 miles southeast of the end of highway 777 along farm lane, and 400 feet southwest of Middle River:

Ap—0 to 10 inches, brown (10YR 4/3) silt loam; moderate fine granular structure; friable; many fine roots; common fine and medium pores; common worm casts and channels; 3 percent rounded fragments as much as 2 inches in diameter; slightly acid; abrupt smooth boundary.

B1t—10 to 17 inches, yellowish brown (10YR 5/6) light clay loam; moderate fine subangular blocky structure; friable; few fine roots; few fine pores; thin patchy clay films; few worm casts and few worm channels coated with material from Ap horizon; 3 percent rounded fragments as much as 1-1/2 inches in diameter; neutral; gradual wavy boundary.

B2t—17 to 36 inches, strong brown (7.5YR 5/6) light clay loam; moderate fine subangular blocky structure; friable; few fine roots; common fine pores; thin continuous brown (7.5YR 4/4) clay films; old root and worm channels filled with pale brown (10YR 6/3) soil material; common oxide stains, few oxide concretions; medium acid; gradual smooth boundary.

B3—36 to 61 inches, yellowish brown (10YR 5/8) heavy loam; weak fine subangular blocky structure; friable; few streaks of pale brown (10YR 6/3) soil material; few oxide concretions and stains; 2 percent rounded fragments as much as 2 inches in diameter, which includes 1 percent highly weathered gray (10YR 6/2) shale fragments; medium acid.

The solum ranges from 40 to more than 60 inches thick. Depth to bedrock ranges from 6 to more than 12 feet. Coarse fragments make up 0 to 25 percent of the surface layer, 0 to 15 percent of the subsoil, and 0 to 70 percent of the substratum.

The A horizon has hue of 10YR or 7.5YR, value of 3 through 5, and chroma of 3 or 4. It is silt loam and loam and their gravelly analogues.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 through 8. It is loam to light silty clay loam.

The B3 horizon, where present, has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 through 8. It ranges from loam to sandy clay loam.

The C horizon ranges from sandy loam to stratified layers of loamy sand and pebbles or cobblestones.

Classification of the soils

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965. Readers interested in further details about the system should refer to "Soil taxonomy" (*6*).

The system of classification has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. In this system the classification is based on the different soil properties that can be observed in the field or those that can be inferred either from other properties that are observable in the field or from the combined data of soil science and other disciplines. The properties selected for the higher categories are the result of soil genesis or of factors that affect soil genesis. In table 16, the soils of the survey area are classified according to the system. Categories of the system are discussed in the following paragraphs.

ORDER. Ten soil orders are recognized as classes in the system. The properties used to differentiate among orders are those that reflect the kind and degree of dominant soil-forming processes that have taken place. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders based primarily on properties that influence soil genesis and are important to plant growth or that are selected to reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of expression of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and a prefix that suggests something about the properties of the soil. An example is Fluvaquents (*Fluv*, meaning river or flood plain, plus *aquent*, the suborder of Entisols that have an aquic moisture regime).

SUBGROUP. Each great group may be divided into three subgroups: the central (typic) concept of the great groups, which is not necessarily the most extensive subgroup; the intergrades, or transitional forms to other

orders, suborders, or great groups; and the extragrades, which have some properties that are representative of the great groups but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that is thought to typify the great group. An example is Typic Fluvaquents.

FAMILY. Families are established within a subgroup on the basis of similar physical and chemical properties that affect management. Among the properties considered in horizons of major biological activity below plow depth are particle-size distribution, mineral content, temperature regime, thickness of the soil penetrable by roots, consistence, moisture equivalent, soil slope, and permanent cracks. A family name consists of the name of a subgroup and a series of adjectives. The adjectives are the class names for the soil properties used as family differentiae. An example is fine-loamy, mixed, acid, mesic Typic Fluvaquents.

SERIES. The series consists of soils that formed in a particular kind of material and have horizons that, except for texture of the surface soil or of the underlying substratum, are similar in differentiating characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineral and chemical composition.

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(5) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus. Supplements replacing pp. 173-188 issued May 1962

(6) United States Department of Agriculture. 1975. Soil taxonomy: a basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv., U.S. Dep. Agric. Handb. 436, 754 pp., illus.

Glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim. An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single mapping unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	More than 9

Base saturation. The degree to which material having base exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to frequent flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Channery soil. A soil, that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coat, clay skin.

Coarse fragments. Mineral or rock particles up to 3 inches (2 millimeters to 7.5 centimeters) in diameter.

Coarse textured (light textured) soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the bases of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures is difficult.

Complex, soil. A mapping unit of two or more kinds of soil occurring in such an intricate pattern that they cannot be shown separately on a soil map at the selected scale of mapping and publication.

Compressible. Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping (or contour farming). Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is 40 or 80 inches (1 or 2 meters).

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave. Unstable walls of cuts made by earthmoving equipment. The soil sloughs easily.

Deferred grazing. A delay in grazing until range plants have reached a specified stage of growth. Grazing is deferred in order to increase the vigor of forage and to allow desirable plants to produce seed. Contrasts with continuous grazing and rotation grazing.

Depth to rock. Bedrock at a depth that adversely affects the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing

season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients, as for example in "hillpeats" and "climatic moors."

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Erosion. The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes a bare surface.

Excess fines. Excess silt and clay. The soil does not provide a source of gravel or sand for construction purposes.

Fast intake. The rapid movement of water into the soil.

Favorable. Favorable soil features for the specified use.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured (heavy textured) soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 37.5 centimeters) long.

Flooding. The temporary covering of soil with water from overflowing streams, runoff from adjacent slopes, and tides. Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; *November-May*, for example, means that flooding can occur during the period November through May. Water standing for short periods after rainfall or commonly covering swamps and marshes is not considered flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forage. Plant material used as feed by domestic animals. Forage can be grazed or cut for hay.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action. Freezing and thawing of soil moisture. Frost action can damage structures and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. A soil having one or more neutral gray horizons as a result of waterlogging and lack of oxygen. The term "gleyed" also designates gray horizons and horizons having yellow and gray mottles as a result of intermittent waterlogging.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material from 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table, which is the upper limit of saturation.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Habitat. The natural abode of a plant or animal; refers to the kind of environment in which a plant or animal normally lives, as opposed to the range or geographical distribution.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major horizons of mineral soil are as follows:

O horizon.—An organic layer, fresh and decaying plant residue, at the surface of a mineral soil.

A horizon.—The mineral horizon, formed or forming at or near the surface, in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon most of which was originally part of a B horizon.

A2 horizon.—A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered, but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Large stones. Rock fragments 10 inches (25 centimeters) or more across. Large stones adversely affect the specified use.

Leaching. The removal of soluble material from soil or other material by percolating water.

Light textured soil. Sand and loamy sand.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. Inadequate strength for supporting loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is greater than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous areas. Areas that have little or no natural soil, are too nearly inaccessible for orderly examination, or cannot otherwise be feasibly classified.

Moderately coarse textured (moderately light textured) soil. Sandy loam and fine sandy loam.

Moderately fine textured (moderately heavy textured) soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three single variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3.

Nutrient, plant. Any element taken in by a plant, essential to its growth, and used by it in the production of food and tissue. Plant nutrients are nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps other elements obtained from the soil; and carbon, hydrogen, and oxygen obtained largely from the air and water.

Pan. A compact, dense layer in a soil. A pan impedes the movement of water and the growth of roots. The word "pan" is commonly combined with other words that more explicitly indicate the nature of the layer; for example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The great variety of unconsolidated organic and mineral material in which soil forms. Consolidated bedrock is not yet parent material by this concept.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly. The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. Terms describing permeability are *very slow* (less than 0.06 inch), *slow* (0.06 to 0.20 inch), *moderately slow* (0.2 to 0.6 inch), *moderate* (0.6 to 2.0 inches), *moderately rapid* (2.0 to 6.0 inches), *rapid* (6.0 to 20 inches), and *very rapid* (more than 20 inches).

Phase, soil. A subdivision of a soil series or other unit in the soil classification system based on differences in the soil that affect its management. A soil series, for example, may be divided into phases on the bases of differences in slope, stoniness, thickness, or some other characteristic that affects management. These differences are too small to justify separate series.

pH value. (See Reaction, soil). A numerical designation of acidity and alkalinity in soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from a semisolid to a plastic state.

Polypedon. A volume of soil having properties within the limits of a soil series, the lowest and most homogeneous category of soil taxonomy. A "soil individual."

Poor outlets. Surface or subsurface drainage outlets difficult or expensive to install.

Productivity (soil). The capability of a soil for producing a specified plant or sequence of plants under a specified system of management. Productivity is measured in terms of output, or harvest, in relation to input.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock. Soil scientists regard as soil only the part of the regolith that is modified by organisms and other soil-building forces. Most engineers describe the whole regolith, even to a great depth, as "soil."

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulates over disintegrating rock.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth. Shallow root zone. The soil is shallow over a layer that greatly restricts roots. See Root zone.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged in stream channels from a drainage area. The water that flows off the land surface without sinking in is called surface runoff; that which enters the ground before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Saprolite (geology). Soft, earthy, clay-rich, thoroughly decomposed rock formed in place by chemical weathering of igneous and metamorphic rock. In soil survey, the term saprolite is applied to any unconsolidated residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage. The rapid movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils, formed from a particular type of parent material, having horizons that, except for the texture of the A or surface horizon, are similar in all profile characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineralogical and chemical composition.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Sinkhole. A depression in a landscape where limestone has been locally dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow intake. The slow movement of water into the soil.

Slow refill. The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones. Rock fragments 3 to 10 inches (7.5 to 25 centimeters) in diameter. Small stones adversely affect the specified use.

Soil. A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows: *very coarse sand* (2.0 millimeters to 1.0 millimeter); *coarse sand* (1.0 to 0.5 millimeter); *medium sand* (0.5 to 0.25 millimeter); *fine sand* (0.25 to 0.10 millimeter); *very fine sand* (0.10 to 0.05 millimeter); *silt* (0.05 to 0.002 millimeter); and *clay* (less than 0.002 millimeter).

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Stone line. A concentration of coarse fragments in soils that generally marks an old weathering surface. In a cross section, the line may be one fragment or more thick. The line generally overlies material that weathered in place and marks the top of a paleosol. It is ordinarily overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stratified. Arranged in strata, or layers. The term refers to geologic material. Layers in soils that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use or management.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it can soak into the soil or flow slowly to a prepared outlet without harm. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea. A stream terrace is frequently called a second bottom, in contrast with a flood plain, and is seldom subject to overflow. A marine terrace, generally wide, was deposited by the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or " very fine."

Thin layer. Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The condition of the soil, especially the soil structure, as related to the growth of plants. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil (engineering). Presumably a fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Unstable fill. Risk of caving or sloughing in banks of fill material.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but the limited geographic soil area does not justify creation of a new series.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water.

Water table, apparent. A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Water table, artesian. A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Water table, perched. A water table standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to a soil or soil material consisting of particles well distributed over a wide range in size or diameter. Such a soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

TABLES

TABLE 1.--TEMPERATURE AND PRECIPITATION DATA

[Data were recorded in the period 1951-75 at Dale Enterprise, Va.]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	42.7	22.3	32.5	69	-5	47	1.76	.96	2.40	5	6.1
February---	45.3	24.1	34.7	69	1	40	2.26	1.28	3.06	6	7.3
March------	54.1	30.9	42.5	80	12	175	2.96	1.69	3.98	7	6.2
April------	65.5	40.1	52.9	86	21	387	2.58	1.47	3.47	7	.6
May--------	74.4	49.2	61.8	90	30	676	3.45	2.18	4.59	8	.0
June-------	82.0	56.8	69.4	95	39	882	3.39	1.92	4.58	7	.0
July-------	85.5	60.8	73.2	97	46	1,029	3.70	1.93	5.15	8	.0
August-----	83.9	59.6	71.8	96	45	986	3.94	1.84	5.64	7	.0
September--	77.8	53.0	65.4	94	32	762	3.23	1.72	4.45	6	.0
October----	67.4	42.4	54.9	85	21	462	2.42	.94	3.61	4	.0
November---	55.2	33.2	44.2	76	10	148	2.16	1.19	2.94	5	1.8
December---	44.9	25.1	35.0	69	2	77	2.26	.96	3.30	5	5.9
Yearly:											
Average--	64.9	41.5	53.2	---	---	---	---	---	---	---	---
Extreme--	---	---	---	98	-5	---	---	---	---	---	---
Total----	---	---	---	---	---	5,671	34.11	29.39	38.37	75	27.9

[1] A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 °F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Data were recorded in the period 1951-75 at Dale Enterprise, Va.]

Probability	Temperature: 24 °F or lower	Temperature: 28 °F or lower	Temperature: 32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 21	May 2	May 18
2 years in 10 later than--	April 15	April 27	May 12
5 years in 10 later than--	April 4	April 18	April 29
First freezing temperature in fall:			
1 year in 10 earlier than--	October 20	October 7	September 25
2 years in 10 earlier than--	October 24	October 13	September 30
5 years in 10 earlier than--	November 2	October 23	October 10

TABLE 3.--GROWING SEASON LENGTH

[Data were recorded in the period 1951-75 at Dale Enterprise, Va.]

Probability	Daily minimum temperature during growing season: Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	192	166	138
8 years in 10	198	173	147
5 years in 10	211	187	163
2 years in 10	223	201	179
1 year in 10	230	209	187

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
1B	Allegheny fine sandy loam, 1 to 7 percent slopes	1,044	0.2
2B	Allegheny cobbly soils, 1 to 7 percent slopes	590	0.1
3B	Allegheny-Cotaco fine sandy loams, 1 to 7 percent slopes	6,663	1.1
3C	Allegheny-Cotaco fine sandy loams, 7 to 15 percent slopes	1,341	0.2
4B	Allegheny-Cotaco cobbly fine sandy loams, 1 to 7 percent slopes	3,928	0.6
4C	Allegheny-Cotaco cobbly fine sandy loams, 7 to 15 percent slopes	1,878	0.3
5	Aqualfs, nearly level	913	0.1
6	Aquents, loamy-skeletal	784	0.1
7	Atkins fine sandy loam	396	0.1
8D	Berks channery silt loam, 7 to 25 percent slopes	13,498	2.2
8E	Berks channery silt loam, 25 to 45 percent slopes	26,633	4.1
8F	Berks channery silt loam, 45 to 60 percent slopes	24,516	3.8
9B2	Berks-Weikert shaly silt loams, 2 to 7 percent slopes, eroded	1,521	0.2
9C2	Berks-Weikert shaly silt loams, 7 to 15 percent slopes, eroded	5,377	0.9
10B2	Bookwood silt loam, 2 to 7 percent slopes, eroded	1,397	0.2
10C2	Bookwood silt loam, 7 to 15 percent slopes, eroded	3,980	0.6
10D2	Bookwood silt loam, 15 to 25 percent slopes, eroded	2,888	0.5
10E2	Bookwood silt loam, 25 to 45 percent slopes, eroded	1,311	0.2
11A	Buchanan fine sandy loam, 0 to 2 percent slopes	3,263	0.5
11B	Buchanan fine sandy loam, 2 to 7 percent slopes	5,711	0.9
12B	Buchanan cobbly fine sandy loam, 0 to 7 percent slopes	1,474	0.2
13C	Buchanan-Monongahela loams, 7 to 15 percent slopes	972	0.2
14	Buckton silt loam	1,964	0.3
15B	Burketown fine sandy loam, 0 to 7 percent slopes	1,871	0.3
15C	Burketown fine sandy loam, 7 to 15 percent slopes	677	0.1
16E	Cataska slaty silt loam, 15 to 45 percent slopes	5,624	0.9
16F	Cataska slaty silt loam, 45 to 70 percent slopes	3,559	0.6
17E	Cataska very stony silt loam, 25 to 50 percent slopes	1,623	0.3
18	Chagrin loam	1,089	0.2
19	Chavies fine sandy loam	3,728	0.6
20B2	Chilhowie silty clay loam, 2 to 7 percent slopes, eroded	1,141	0.2
20C2	Chilhowie silty clay loam, 7 to 15 percent slopes, eroded	4,042	0.7
21B3	Chilhowie shaly silty clay loam, 2 to 7 percent slopes, severely eroded	337	0.1
21C3	Chilhowie shaly silty clay loam, 7 to 15 percent slopes, severely eroded	1,228	0.2
21D3	Chilhowie shaly silty clay loam, 15 to 25 percent slopes, severely eroded	3,784	0.6
21E3	Chilhowie shaly silty clay loam, 25 to 45 percent slopes, severely eroded	2,763	0.4
22B2	Chilhowie-Edom complex, 2 to 7 percent slopes, eroded	734	0.1
22C2	Chilhowie-Edom complex, 7 to 15 percent slopes, eroded	2,073	0.3
22D2	Chilhowie-Edom complex, 15 to 25 percent slopes, eroded	1,203	0.2
23C3	Chilhowie-Edom shaly silty clay loams, 7 to 15 percent slopes, severely eroded	356	0.1
23E3	Chilhowie-Edom shaly silty clay loams, 15 to 45 percent slopes, severely eroded	315	(1)
24B2	Christian fine sandy loam, 2 to 7 percent slopes, eroded	401	0.1
24C2	Christian fine sandy loam, 7 to 15 percent slopes, eroded	1,513	0.2
24D2	Christian fine sandy loam, 15 to 25 percent slopes, eroded	1,282	0.2
24E2	Christian fine sandy loam, 25 to 45 percent slopes, eroded	695	0.1
25C2	Christian cherty fine sandy loam, 7 to 15 percent slopes, eroded	637	0.1
25D2	Christian cherty fine sandy loam, 15 to 25 percent slopes, eroded	1,136	0.2
26	Cotaco Variant silt loam	876	0.1
27	Craigsville fine sandy loam	4,022	0.6
28	Craigsville cobbly fine sandy loam	9,156	1.5
29E	Drall extremely stony sandy loam, 15 to 45 percent slopes	3,394	0.5
29F	Drall extremely stony sandy loam, 45 to 80 percent slopes	17,480	2.7
30B2	Edom silt loam, 2 to 7 percent slopes, eroded	3,737	0.6
30C2	Edom silt loam, 7 to 15 percent slopes, eroded	4,736	0.8
30D2	Edom silt loam, 15 to 25 percent slopes, eroded	1,427	0.2
31B3	Edom silty clay loam, 2 to 7 percent slopes, severely eroded	234	(1)
31C3	Edom silty clay loam, 7 to 15 percent slopes, severely eroded	593	0.1
32C2	Edom-Rock outcrop complex, 0 to 15 percent slopes, eroded	414	0.1
32E2	Edom-Rock outcrop complex, 15 to 45 percent slopes, eroded	362	0.1
33E	Elliber very cherty silt loam, 15 to 45 percent slopes	458	0.1
34F	Elliber and Jefferson very cherty soils, 45 to 70 percent slopes	880	0.1
35B2	Endcav silt loam, 2 to 7 percent slopes, eroded	899	0.1
35C2	Endcav silt loam, 7 to 15 percent slopes, eroded	326	0.1
36B2	Endcav silt loam, rocky, 2 to 7 percent slopes, eroded	214	(1)
37C2	Endcav-Rock outcrop complex, 2 to 15 percent slopes, eroded	340	0.1
38B	Ernest silt loam, 0 to 7 percent slopes	546	0.1
38C	Ernest silt loam, 7 to 15 percent slopes	74	(1)
39	Fluvaquents, nearly level	6,932	1.1
40B2	Frederick-Christian silt loams, 2 to 7 percent slopes, eroded	21,048	3.2
40C2	Frederick-Christian silt loams, 7 to 15 percent slopes, eroded	43,273	6.8

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
40D2	Frederick-Christian silt loams, 15 to 25 percent slopes, eroded	13,546	2.2
40E2	Frederick-Christian silt loams, 25 to 45 percent slopes, eroded	2,252	0.4
41B3	Frederick-Christian silty clay loams, 2 to 7 percent slopes, severely eroded	624	0.1
41C3	Frederick-Christian silty clay loams, 7 to 15 percent slopes, severely eroded	4,176	0.7
41D3	Frederick-Christian silty clay loams, 15 to 25 percent slopes, severely eroded	4,366	0.7
42B2	Frederick-Christian cherty silt loams, 2 to 7 percent slopes, eroded	3,971	0.6
42C2	Frederick-Christian cherty silt loams, 7 to 15 percent slopes, eroded	16,348	2.6
42D2	Frederick-Christian cherty silt loams, 15 to 25 percent slopes, eroded	23,532	3.6
42E2	Frederick-Christian cherty silt loams, 25 to 45 percent slopes, eroded	2,916	0.5
43C	Frederick-Christian very cherty silt loams, 7 to 15 percent slopes	743	0.1
43D	Frederick-Christian very cherty silt loams, 15 to 25 percent slopes	959	0.2
43E	Frederick-Christian very cherty silt loams, 25 to 45 percent slopes	722	0.1
44B2	Frederick-Christian silt loams, rocky, 2 to 7 percent slopes, eroded	540	0.1
44C2	Frederick-Christian silt loams, rocky, 7 to 15 percent slopes, eroded	2,430	0.4
44D2	Frederick-Christian silt loams, rocky, 15 to 25 percent slopes, eroded	1,475	0.2
44E2	Frederick-Christian silt loams, rocky, 25 to 45 percent slopes, eroded	510	0.1
45C2	Frederick-Rock outcrop complex, 0 to 15 percent slopes, eroded	6,332	1.0
45E2	Frederick-Rock outcrop complex, 15 to 45 percent slopes, eroded	5,692	0.9
46B	Frederick-Nixa complex, 2 to 7 percent slopes	1,119	0.2
46C	Frederick-Nixa complex, 7 to 15 percent slopes	1,060	0.2
47C	Guernsey silt loam, 2 to 10 percent slopes	1,458	0.2
48E	Hartleton channery loam, 15 to 45 percent slopes	1,614	0.3
49F	Hartleton soils, 25 to 75 percent slopes	9,008	1.5
50D	Hazleton stony fine sandy loam, 7 to 25 percent slopes	2,474	0.4
50E	Hazleton stony fine sandy loam, 25 to 45 percent slopes	3,340	0.5
51D	Hazleton soils, 7 to 25 percent slopes	4,922	0.8
51F	Hazleton soils, 25 to 70 percent slopes	30,850	4.8
52F	Hazleton-Lehew complex, 25 to 70 percent slopes	31,280	4.9
53C	Jefferson cobbly fine sandy loam, 7 to 15 percent slopes	1,964	0.3
53D	Jefferson cobbly fine sandy loam, 15 to 25 percent slopes	1,572	0.3
54C	Leetonia very stony loamy sand, 7 to 15 percent slopes	664	0.1
54E	Leetonia extremely stony loamy sand, 15 to 45 percent slopes	2,287	0.4
55D	Lehew fine sandy loam, 7 to 25 percent slopes	1,614	0.3
56D	Lehew fine sandy loam, rocky, 7 to 25 percent slopes	4,127	0.7
57E	Lehew flaggy fine sandy loam, 25 to 45 percent slopes	5,871	0.9
57F	Lehew flaggy fine sandy loam, 45 to 70 percent slopes	19,498	3.0
58D	Lew very stony silt loam, 7 to 25 percent slopes	1,889	0.3
59E	Lew bouldery silt loam, 10 to 45 percent slopes	5,646	0.9
59F	Lew bouldery silt loam, 45 to 70 percent slopes	3,315	0.5
60	Massanetta silt loam	1,284	0.2
61B	Millrock loamy fine sand, 0 to 4 percent slopes	952	0.2
62B	Monongahela fine sandy loam, 0 to 7 percent slopes	11,374	1.7
62C	Monongahela fine sandy loam, 7 to 15 percent slopes	3,416	0.5
63B	Monongahela cobbly fine sandy loam, 0 to 7 percent slopes	3,352	0.5
63C	Monongahela cobbly fine sandy loam, 7 to 15 percent slopes	3,880	0.6
64C	Nixa very cherty silt loam, 2 to 15 percent slopes	1,956	0.3
64D	Nixa very cherty silt loam, 15 to 25 percent slopes	299	(1)
65E	Opequon-Rock outcrop complex, 7 to 45 percent slopes	686	0.1
66	Philo silt loam	1,347	0.2
66X	Pits and dumps	142	(1)
67	Purdy silt loam	1,401	0.2
68E	Rock outcrop-Chilhowie complex, steep	430	0.1
69F	Rock outcrop-Drall complex, steep	1,674	0.3
70C	Rock outcrop-Frederick complex, sloping	5,324	0.9
70E	Rock outcrop-Frederick complex, steep	8,648	1.4
71	Rubble land	739	0.1
72F	Rushtown shaly silt loam, 45 to 80 percent slopes	4,262	0.7
73B2	Sequoia silt loam, 2 to 7 percent slopes, eroded	1,715	0.3
73C2	Sequoia silt loam, 7 to 15 percent slopes, eroded	581	0.1
74B2	Sequoia-Berks silt loams, 2 to 7 percent slopes, eroded	2,868	0.5
74C2	Sequoia-Berks silt loams, 7 to 15 percent slopes, eroded	3,175	0.5
74D2	Sequoia-Berks silt loams, 15 to 25 percent slopes, eroded	638	0.1
75B2	Shenval loam, 2 to 7 percent slopes, eroded	1,305	0.2
75C2	Shenval loam, 7 to 15 percent slopes, eroded	1,461	0.2
75D2	Shenval loam, 15 to 25 percent slopes, eroded	467	0.1
76C	Shenval cobbly loam, 7 to 15 percent slopes	320	0.1
76D	Shenval cobbly loam, 15 to 25 percent slopes	174	(1)
77C	Sherando sandy loam, 2 to 15 percent slopes	1,763	0.3
77D	Sherando sandy loam, 15 to 25 percent slopes	660	0.1
78C	Sherando cobbly sandy loam, 2 to 15 percent slopes	5,649	0.9

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
78E	Sherando cobbly sandy loam, 15 to 45 percent slopes	1,975	0.3
79B	Timberville silt loam, 0 to 7 percent slopes	8,347	1.3
80B	Timberville cherty silt loam, 0 to 7 percent slopes	1,085	0.2
81	Tioga fine sandy loam	776	0.1
82	Udifluvents, loamy	2,998	0.5
83	Udorthents, sandy	4,592	0.7
84	Udorthents, shaly	289	(1)
85	Udorthents, bouldery	3,058	0.5
86B	Unison fine sandy loam, 2 to 7 percent slopes	3,085	0.5
86C2	Unison fine sandy loam, 7 to 15 percent slopes, eroded	1,267	0.2
86D2	Unison fine sandy loam, 15 to 25 percent slopes, eroded	367	0.1
87B	Unison cobbly fine sandy loam, 2 to 7 percent slopes	691	0.1
87C	Unison cobbly fine sandy loam, 7 to 15 percent slopes	736	0.1
87E	Unison cobbly fine sandy loam, 15 to 45 percent slopes	991	0.2
88	Urban land	1,269	0.2
89D3	Weikert very shaly silt loam, 7 to 25 percent slopes, severely eroded	314	0.1
89E3	Weikert very shaly silt loam, 25 to 45 percent slopes, severely eroded	585	0.1
89F3	Weikert very shaly silt loam, 45 to 80 percent slopes, severely eroded	6,686	1.1
90D2	Weikert-Berks shaly silt loams, 15 to 25 percent slopes, eroded	5,180	0.8
90E3	Weikert-Berks shaly silt loams, 25 to 50 percent slopes, severely eroded	6,331	1.0
91B	Wheeling silt loam, 0 to 7 percent slopes	2,914	0.5
91C2	Wheeling silt loam, 7 to 15 percent slopes, eroded	739	0.1
92B	Wheeling gravelly loam, 2 to 7 percent slopes	476	0.1
92C2	Wheeling gravelly loam, 7 to 15 percent slopes, eroded	323	0.1
	Water	2,044	0.3
	Total	631,040	100.0

[1] Less than 0.1 percent.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[All yields were estimated for a high level of management in 1977. Absence of a yield figure indicates the crop is seldom grown or is not suited]

Soil name and map symbol	Corn	Corn silage	Wheat	Barley	Alfalfa hay	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Ton	Ton	AUM[1]
1B----- Allegheny	115	23	45	65	4.5	3.5	6.5
2B----- Allegheny	110	22	40	60	4.0	3.0	6.5
3B----- Allegheny	113	22	40	60	4.0	3.3	6.5
3C----- Allegheny	105	21	40	60	3.5	3.0	6.5
4B----- Allegheny	103	21	35	60	3.5	2.8	6.1
4C----- Allegheny	91	18	31	53	3.0	2.8	5.6
[2]5. Aqualfs							
[2]6. Aquents							
7----- Atkins	100	20	30	---	---	3.0	5.5
8D----- Berks	70	14	30	50	3.0	2.5	5.5
8E, 8F----- Berks	---	---	---	---	---	---	---
9B2----- Berks	74	15	32	57	3.0	2.7	5.7
9C2----- Berks	70	14	30	52	2.7	2.3	5.0
10B2----- Bookwood	100	25	45	55	4.5	3.5	8.5
10C2----- Bookwood	80	24	40	50	4.0	3.0	8.0
10D2----- Bookwood	70	22	35	40	3.5	2.5	7.5
10E2----- Bookwood	---	---	---	---	---	---	---
11A----- Buchanan	110	22	40	65	3.5	3.0	6.5
11B, 12B----- Buchanan	110	22	40	65	3.5	3.0	6.5
13C----- Buchanan	90	18	35	60	3.0	3.0	6.5
14----- Buckton	130	26	55	---	5.5	3.5	9.0

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Wheat	Barley	Alfalfa hay	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Ton	Ton	AUM[1]
15B Burketown	110	22	45	65	3.5	3.0	7.5
15C Burketown	90	18	35	60	3.0	3.0	7.5
16E, 16F, 17E Cataska	---	---	---	---	---	---	---
18 Chagrin	125	25	45	---	---	4.5	8.0
19 Chavies	115	23	45	65	5.0	3.5	7.0
20B2 Chilhowie	75	15	25	---	---	2.5	6.5
20C2 Chilhowie	70	14	25	---	---	2.5	6.5
21B3 Chilhowie	75	15	25	---	---	2.5	6.5
21C3 Chilhowie	70	14	25	---	---	2.5	6.5
21D3 Chilhowie	---	---	---	---	---	---	---
21E3 Chilhowie	---	---	---	---	---	---	---
22B2 Chilhowie	88	18	33	---	---	2.8	7.1
22C2 Chilhowie	80	16	31	---	---	2.8	6.6
22D2 Chilhowie	---	---	---	---	---	---	---
23C3 Chilhowie	75	15	31	---	---	2.6	6.1
23E3 Chilhowie	---	---	---	---	---	---	---
24B2 Christian	125	25	45	75	4.5	3.5	8.3
24C2 Christian	120	24	40	70	4.5	3.0	8.0
24D2 Christian	110	22	35	60	4.0	3.0	7.7
24E2 Christian	---	---	---	---	---	---	7.0
25C2 Christian	120	24	40	70	4.5	3.0	8.0
25D2 Christian	110	22	35	60	4.0	3.0	7.7
26 Cotaco Variant	100	20	40	---	---	2.5	6.0

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Wheat	Barley	Alfalfa hay	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Ton	Ton	AUM[1]
27 Craigsville	75	13	30	50	2.0	1.8	4.5
28 Craigsville	70	12	25	45	2.0	1.5	4.5
29E, 29F Drall	---	---	---	---	---	---	---
30B2 Edom	100	20	40	70	4.0	3.0	7.5
30C2 Edom	90	18	35	65	3.5	3.0	6.5
30D2 Edom	80	16	35	60	3.0	2.5	5.5
31B3 Edom	100	20	40	70	4.0	3.0	7.5
31C3 Edom	80	16	35	60	3.0	2.5	5.5
32C2 Edom	---	---	---	---	---	---	4.0
32E2 Edom	---	---	---	---	---	---	3.5
33E Elliber	---	---	---	---	---	---	---
34F Elliber	---	---	---	---	---	---	---
35B2 Endcav	110	22	45	70	5.0	3.5	9.0
35C2 Endcav	100	20	40	65	4.5	3.0	8.5
36B2 Endcav	110	22	45	70	5.0	3.5	9.0
37C2 Endcav	---	---	---	---	---	---	6.0
38B Ernest	100	20	40	65	3.5	2.5	6.5
38C Ernest	95	18	35	60	3.5	2.5	6.5
[2]39. Fluvaquents							
40B2 Frederick	127	26	45	76	4.5	3.5	8.4
40C2 Frederick	120	24	40	70	4.5	3.0	8.0
40D2 Frederick	110	22	36	60	4.0	3.0	7.8
40E2 Frederick	---	---	---	---	---	---	7.0

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Wheat	Barley	Alfalfa hay	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Ton	Ton	AUM[1]
41B3 Frederick	115	23	35	65	4.5	3.0	8.0
41C3 Frederick	110	22	35	60	4.0	3.0	7.7
41D3 Frederick	---	---	---	---	---	---	7.0
42B2 Frederick	125	25	45	75	4.5	3.5	8.3
42C2 Frederick	120	24	40	70	4.5	3.0	8.0
42D2 Frederick	110	22	35	60	4.0	3.0	7.7
42E2 Frederick	---	---	---	---	---	---	7.0
43C Frederick	120	24	40	70	3.0	2.5	6.0
43D, 43E Frederick	---	---	---	---	---	---	5.5
44B2 Frederick	125	25	45	75	4.5	3.5	8.3
44C2 Frederick	120	24	40	70	4.5	3.0	8.0
44D2 Frederick	110	22	36	60	4.0	3.0	7.8
44E2 Frederick	---	---	---	---	---	---	7.0
45C2 Frederick	---	---	---	---	---	---	5.5
45E2 Frederick	---	---	---	---	---	---	4.5
46B Frederick	100	20	34	---	---	2.5	5.0
46C Frederick	90	18	30	---	---	2.5	4.0
47C Guernsey	100	20	40	65	---	4.0	6.5
48E Hartleton	---	---	---	---	---	---	---
49F. Hartleton							
50D Hazleton	---	---	---	---	---	---	3.5
50E Hazleton	---	---	---	---	---	---	---
51D Hazleton	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Wheat	Barley	Alfalfa hay	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Ton	Ton	AUM[1]
51F. Hazleton	---	---	---	---	---	---	---
52F. Hazleton	---	---	---	---	---	---	---
53C. Jefferson	85	17	35	70	4.0	2.5	6.0
53D. Jefferson	---	---	---	---	---	---	---
54C. Leetonia	---	---	---	---	---	---	---
54E. Leetonia	---	---	---	---	---	---	---
55D, 56D. Lehew	70	14	30	50	3.0	2.0	5.5
57E. Lehew	---	---	---	---	---	---	---
57F. Lehew	---	---	---	---	---	---	---
58D. Lew	---	---	---	---	---	---	5.6
59E, 59F. Lew	---	---	---	---	---	---	4.5
60. Massanetta	100	20	---	---	---	3.0	5.5
61B. Millrock	70	14	30	50	3.0	2.0	9.0
62B. Monongahela	110	22	40	65	3.5	3.0	6.5
62C. Monongahela	90	18	35	60	3.0	3.0	6.5
63B. Monongahela	110	22	40	65	3.5	3.0	6.5
63C. Monongahela	90	18	35	60	3.0	3.0	6.5
64C. Nixa	---	---	---	---	---	---	---
64D. Nixa							
65E. Opequon	---	---	---	---	---	---	---
66. Philo	130	---	45	80	4.5	3.5	8.5
[2]66X. Pits and dumps							
67. Purdy	80	16	---	55	---	2.5	---

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Wheat	Barley	Alfalfa hay	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Ton	Ton	AUM[1]
68E Rock outcrop	---	---	---	---	---	---	---
69F Rock outcrop	---	---	---	---	---	---	---
70C Rock outcrop	---	---	---	---	---	---	---
70E Rock outcrop	---	---	---	---	---	---	---
[2]71. Rubble land							
72F Rushtown	---	---	---	---	---	---	---
73B2, 73C2 Sequoia	105	22	40	50	3.5	3.0	6.5
74B2 Sequoia	90	18	38	45	3.0	2.5	5.6
74C2 Sequoia	64	---	38	---	2.8	---	5.2
74D2 Sequoia	---	---	---	---	---	---	---
75B2 Shenval	130	26	50	80	5.0	4.5	8.5
75C2 Shenval	125	25	45	75	4.5	4.5	8.5
75D2 Shenval	105	21	40	65	4.0	4.2	8.0
76C Shenval	125	25	45	75	4.5	4.5	8.5
76D Shenval	105	21	40	65	4.0	4.2	8.0
77C Sherando	---	---	---	---	2.5	2.0	5.4
77D Sherando	---	---	---	---	---	---	---
78C Sherando	---	---	---	---	---	---	5.4
78E Sherando	---	---	---	---	---	---	---
79B Timberville	100	20	55	40	---	2.5	5.0
80B Timberville	90	18	45	40	---	2.5	5.0
81 Tioga	120	---	45	80	4.5	3.5	8.5
[2]82. Udifluvents							

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Corn silage	Wheat	Barley	Alfalfa hay	Grass-legume hay	Pasture
	Bu	Ton	Bu	Bu	Ton	Ton	AUM[1]
[2]83, [2]84, [2]85. Udorthents							
86B-----Unison	120	25	50	65	4.5	5.0	9.2
86C2-----Unison	115	23	45	55	4.0	4.7	9.2
86D2-----Unison	100	20	40	40	4.0	4.5	9.0
87B-----Unison	105	23	43	55	4.0	4.2	8.5
87C-----Unison	100	21	40	45	4.0	3.7	8.0
87E-----Unison	---	---	---	---	---	---	5.5
[2]88. Urban land							
89D3-----Weikert	---	---	---	---	---	---	---
89E3, 89F3-----Weikert	---	---	---	---	---	---	---
90D2-----Weikert	---	---	---	---	---	---	---
90E3-----Weikert	---	---	---	---	---	---	---
91B-----Wheeling	125	25	45	75	4.5	4.0	8.5
91C2-----Wheeling	115	23	40	70	4.5	3.5	8.5
92B-----Wheeling	125	25	45	75	4.5	4.0	8.5
92C2-----Wheeling	115	23	40	70	4.5	3.5	8.5

[1]Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for a period of 30 days.
[2]See the map unit description for the composition and behavior of the entire unit.

TABLE 6.--BUILDING SITE DEVELOPMENT

[Some of the terms used in this table to describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry means the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1B Allegheny	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
[1]2B Allegheny	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength.	Severe: small stones.
[1]3B:						
Allegheny	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
Cotaco	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Moderate: low strength.	Slight.
[1]3C:						
Allegheny	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Moderate: slope.
Cotaco	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Severe: slope.	Moderate: low strength.	Moderate: slope.
[1]4B:						
Allegheny	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength.	Severe: small stones.
Cotaco	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: low strength, wetness.	Severe: small stones.
[1]4C:						
Allegheny	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Severe: small stones.
Cotaco	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: low strength, slope, wetness.	Severe: small stones.
[1]5. Aqualfs						
[1]6. Aquents						
7 Atkins	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: wetness, floods.
8D, 8E, 8F Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
[1]9B2:						
Berks	Moderate: depth to rock.	Slight	Moderate: depth to rock.	Moderate: slope.	Slight	Moderate: depth to rock, small stones.
Weikert	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock, frost action.	Moderate: small stones.

See footnote at end of table.

TABLE 6.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
[1]9C2:						
Berks	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope.	Moderate: slope, depth to rock, small stones.
Weikert	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock, frost action.	Moderate: slope, small stones.
10B2 Bookwood	Moderate: depth to rock.	Moderate: frost action.	Moderate: depth to rock.	Moderate: depth to rock, frost action.	Moderate: frost action.	Slight.
10C2 Bookwood	Moderate: depth to rock.	Moderate: frost action.	Moderate: depth to rock.	Severe: slope.	Moderate: frost action.	Moderate: slope.
10D2, 10E2 Bookwood	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
11A, 11B Buchanan	Moderate: wetness.	Severe: frost action.	Moderate: wetness.	Severe: frost action.	Severe: frost action.	Slight.
12B Buchanan	Moderate: small stones, wetness.	Severe: frost action.	Moderate: wetness.	Severe: frost action.	Severe: frost action.	Moderate: small stones.
[1]13C:						
Buchanan	Moderate: slope, wetness.	Severe: frost action.	Moderate: slope, wetness.	Severe: slope, frost action.	Severe: frost action.	Moderate: slope.
Monongahela	Moderate: slope, wetness.	Severe: frost action.	Moderate: slope, wetness.	Severe: slope, frost action.	Severe: frost action.	Moderate: slope.
14 Buckton	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods.
15B Burketown	Severe: wetness.	Moderate: wetness, frost action.	Severe: wetness.	Moderate: wetness, frost action, slope.	Moderate: frost action.	Slight.
15C Burketown	Severe: wetness.	Moderate: slope, wetness, frost action.	Severe: wetness.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
16E, 16F Cataska	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.
17E Cataska	Severe: slope, depth to rock, small stones.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: depth to rock.
18 Chagrin	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods.
19 Chavies	Moderate: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods.	Slight.
20B2 Chilhowie	Severe: depth to rock.	Moderate: shrink-swell.	Severe: depth to rock.	Moderate: slope, shrink-swell.	Moderate: shrink-swell.	Moderate: depth to rock.

See footnote at end of table.

TABLE 6.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
20C2-------------- Chilhowie	Severe: depth to rock.	Moderate: slope, shrink-swell.	Severe: depth to rock.	Severe: slope.	Moderate: slope, shrink-swell.	Moderate: slope, depth to rock.
21B3-------------- Chilhowie	Severe: depth to rock.	Moderate: shrink-swell.	Severe: depth to rock.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: depth to rock.
21C3-------------- Chilhowie	Severe: depth to rock.	Moderate: slope, shrink-swell.	Severe: depth to rock.	Severe: slope.	Moderate: slope, shrink-swell.	Moderate: slope, depth to rock.
21D3, 21E3-------- Chilhowie	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
[1]22B2:						
Chilhowie--------	Severe: depth to rock.	Moderate: shrink-swell.	Severe: depth to rock.	Moderate: slope, shrink-swell.	Moderate: shrink-swell.	Moderate: depth to rock.
Edom-------------	Severe: too clayey.	Severe: low strength.	Moderate: low strength.	Severe: low strength.	Severe: low strength.	Moderate: too clayey.
[1]22C2:						
Chilhowie--------	Severe: depth to rock.	Moderate: slope, shrink-swell.	Severe: depth to rock.	Severe: slope.	Moderate: slope, shrink-swell.	Moderate: slope, depth to rock.
Edom-------------	Severe: too clayey.	Severe: low strength.	Moderate: slope, low strength.	Severe: slope, low strength.	Severe: low strength.	Moderate: slope, too clayey.
[1]22D2:						
Chilhowie--------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Edom-------------	Severe: slope, too clayey.	Severe: slope, low strength.	Severe: slope.	Severe: slope, low strength.	Severe: slope, low strength.	Severe: slope.
[1]23C3:						
Chilhowie--------	Severe: depth to rock.	Moderate: slope, shrink-swell.	Severe: depth to rock.	Severe: slope.	Moderate: slope, shrink-swell.	Moderate: slope, depth to rock.
Edom-------------	Severe: too clayey.	Severe: low strength.	Moderate: slope, low strength.	Severe: slope, low strength.	Severe: low strength.	Moderate: slope, too clayey.
[1]23E3:						
Chilhowie--------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Edom-------------	Severe: slope, too clayey.	Severe: slope, low strength.	Severe: slope.	Severe: slope, low strength.	Severe: slope, low strength.	Severe: slope.
24B2-------------- Christian	Severe: too clayey.	Moderate: low strength.	Moderate: low strength.	Moderate: slope, low strength.	Severe: low strength.	Slight.
24C2-------------- Christian	Severe: too clayey.	Moderate: slope, low strength.	Moderate: slope, low strength.	Severe: slope.	Severe: low strength.	Moderate: slope.
24D2, 24E2-------- Christian	Severe: slope, too clayey.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.

See footnote at end of table.

TABLE 6.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
25C2: Christian	Severe: too clayey.	Moderate: slope, low strength.	Moderate: slope, low strength.	Severe: slope.	Severe: low strength.	Moderate: slope, small stones.
25D2: Christian	Severe: slope, too clayey.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
26: Cotaco Variant	Severe: wetness, too clayey.	Moderate: wetness, shrink-swell, frost action.	Severe: wetness, low strength.	Moderate: low strength, wetness, frost action.	Severe: low strength.	Slight.
27: Craigsville	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
28: Craigsville	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods, small stones.
29E, 29F: Drall	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
30B2: Edom	Severe: too clayey.	Severe: low strength.	Moderate: low strength.	Severe: low strength.	Severe: low strength.	Moderate: too clayey.
30C2: Edom	Severe: too clayey.	Severe: low strength.	Moderate: slope, low strength.	Severe: slope, low strength.	Severe: low strength.	Moderate: slope, too clayey.
30D2: Edom	Severe: slope, too clayey.	Severe: slope, low strength.	Severe: slope.	Severe: slope, low strength.	Severe: slope, low strength.	Severe: slope.
31B3: Edom	Severe: too clayey.	Severe: low strength.	Moderate: low strength.	Severe: low strength.	Severe: low strength.	Moderate: too clayey.
31C3: Edom	Severe: too clayey.	Severe: low strength.	Moderate: slope, low strength.	Severe: slope, low strength.	Severe: low strength.	Moderate: slope, too clayey.
[1]32C2:						
Edom	Severe: too clayey.	Severe: low strength.	Moderate: low strength.	Severe: low strength.	Severe: low strength.	Moderate: too clayey.
Rock outcrop.						
[1]32E2:						
Edom	Severe: slope, too clayey.	Severe: slope, low strength.	Severe: slope.	Severe: slope, low strength.	Severe: slope, low strength.	Severe: slope.
Rock outcrop.						
33E: Elliber	Severe: slope, small stones.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
[1]34F:						
Elliber	Severe: slope, small stones.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Jefferson	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
35B2: Endcav	Severe: too clayey.	Severe: shrink-swell, low strength.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Slight.

See footnote at end of table.

TABLE 6.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
35C2: Endcav	Severe: too clayey.	Severe: shrink-swell, low strength.	Severe: shrink-swell.	Severe: slope, shrink-swell.	Severe: shrink-swell.	Moderate: slope.
36B2: Endcav	Severe: too clayey.	Severe: shrink-swell, low strength.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Slight.
[1]37C2:						
Endcav	Severe: too clayey.	Severe: shrink-swell, low strength.	Severe: shrink-swell.	Severe: slope, shrink-swell.	Severe: shrink-swell.	Moderate: slope.
Rock outcrop.						
38B: Ernest	Moderate: wetness.	Moderate: wetness, frost action.	Severe: wetness.	Moderate: slope, wetness, frost action.	Moderate: frost action.	Slight.
38C: Ernest	Moderate: slope, wetness.	Moderate: wetness, frost action, slope.	Severe: wetness.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
[1]39. Fluvaquents						
[1]40B2:						
Frederick	Severe: too clayey.	Moderate: low strength.	Moderate: low strength.	Moderate: slope, low strength.	Severe: low strength.	Slight.
Christian	Severe: too clayey.	Moderate: low strength.	Moderate: low strength.	Moderate: slope, low strength.	Severe: low strength.	Slight.
[1]40C2:						
Frederick	Severe: too clayey.	Moderate: slope, low strength.	Moderate: slope, low strength.	Severe: slope.	Severe: low strength.	Moderate: slope.
Christian	Severe: too clayey.	Moderate: slope, low strength.	Moderate: slope, low strength.	Severe: slope.	Severe: low strength.	Moderate: slope.
[1]40D2, [1]40E2:						
Frederick	Severe: slope, too clayey.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
Christian	Severe: slope, too clayey.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
[1]41B3:						
Frederick	Severe: too clayey.	Moderate: low strength.	Moderate: low strength.	Moderate: slope, low strength.	Severe: low strength.	Moderate: too clayey.
Christian	Severe: too clayey.	Moderate: low strength.	Moderate: low strength.	Moderate: slope, low strength.	Severe: low strength.	Moderate: too clayey.
[1]41C3:						
Frederick	Severe: too clayey.	Moderate: slope, low strength.	Moderate: slope, low strength.	Severe: slope.	Severe: low strength.	Moderate: slope, too clayey.

See footnote at end of table.

TABLE 6.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
[1]41C3:						
Christian--------	Severe: too clayey.	Moderate: slope, low strength.	Moderate: slope, low strength.	Severe: slope.	Severe: low strength.	Moderate: slope, too clayey.
[1]41D3:						
Frederick--------	Severe: slope, too clayey.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
Christian--------	Severe: slope, too clayey.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
[1]42B2:						
Frederick--------	Severe: too clayey.	Moderate: low strength.	Moderate: low strength.	Moderate: slope, low strength.	Severe: low strength.	Moderate: small stones.
Christian--------	Severe: too clayey.	Moderate: low strength.	Moderate: low strength.	Moderate: slope, low strength.	Severe: low strength.	Moderate: small stones.
[1]42C2:						
Frederick--------	Severe: too clayey.	Moderate: slope, low strength.	Moderate: slope, low strength.	Severe: slope.	Severe: low strength.	Moderate: slope, small stones.
Christian--------	Severe: too clayey.	Moderate: slope, low strength.	Moderate: slope, low strength.	Severe: slope.	Severe: low strength.	Moderate: slope, small stones.
[1]42D2, [1]42E2:						
Frederick--------	Severe: slope, too clayey.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
Christian--------	Severe: slope, too clayey.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
[1]43C:						
Frederick--------	Severe: too clayey.	Moderate: slope, low strength.	Moderate: slope, low strength.	Severe: slope.	Severe: low strength.	Severe: small stones.
Christian--------	Severe: too clayey.	Moderate: slope, low strength.	Moderate: slope, low strength.	Severe: slope.	Severe: low strength.	Severe: small stones.
[1]43D, [1]43E:						
Frederick--------	Severe: slope, too clayey.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
Christian--------	Severe: slope, too clayey.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
[1]44B2:						
Frederick--------	Severe: too clayey.	Moderate: low strength.	Moderate: low strength.	Moderate: slope, low strength.	Severe: low strength.	Slight.
Christian--------	Severe: too clayey.	Moderate: low strength.	Moderate: low strength.	Moderate: slope, low strength.	Severe: low strength.	Slight.

See footnote at end of table.

TABLE 6.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
[1]44C2:						
Frederick	Severe: too clayey.	Moderate: slope, low strength.	Moderate: slope, low strength.	Severe: slope.	Severe: low strength.	Moderate: slope.
Christian	Severe: too clayey.	Moderate: slope, low strength.	Moderate: slope, low strength.	Severe: slope.	Severe: low strength.	Moderate: slope.
[1]44D2, [1]44E2:						
Frederick	Severe: slope, too clayey.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
Christian	Severe: slope, too clayey.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
[1]45C2:						
Frederick	Severe: too clayey.	Moderate: slope, low strength.	Moderate: slope, low strength.	Severe: slope.	Severe: low strength.	Moderate: slope.
Rock outcrop.						
[1]45E2:						
Frederick	Severe: slope, too clayey.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
Rock outcrop.						
[1]46B:						
Frederick	Severe: too clayey.	Moderate: low strength.	Moderate: low strength.	Moderate: slope, low strength.	Severe: low strength.	Moderate: small stones.
Nixa	Severe: small stones.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Moderate: small stones.
[1]46C:						
Frederick	Severe: too clayey.	Moderate: slope, low strength.	Moderate: slope, low strength.	Severe: slope.	Severe: low strength.	Moderate: slope, small stones.
Nixa	Severe: small stones.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Moderate: slope, small stones.
47C Guernsey	Severe: wetness.	Severe: low strength.	Severe: wetness, low strength.	Severe: low strength.	Severe: low strength.	Moderate: wetness, small stones.
48E, [1]49F Hartleton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
50D, 50E Hazleton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
[1]51D, [1]51F Hazleton	Severe: slope.	Severe: slope, large stones.	Severe: slope.	Severe: slope, large stones.	Severe: slope.	Severe: slope.
[1]52F:						
Hazleton	Severe: slope.	Severe: slope, large stones.	Severe: slope.	Severe: slope, large stones.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 6.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
52F[1]: Lehew	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
53C Jefferson	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, low strength.	Moderate: slope, small stones.
53D Jefferson	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
54C Leetonia	Severe: cutbanks cave.	Moderate: large stones.	Moderate: depth to rock.	Severe: slope.	Moderate: slope.	Severe: too sandy.
54E Leetonia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
55D, 56D, 57E, 57F Lehew	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
58D, 59E, 59F Lew	Severe: slope, small stones.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
60 Massanetta	Severe: wetness, floods.	Severe: wetness, floods, frost action.	Severe: wetness, floods.	Severe: wetness, floods, frost action.	Severe: floods, frost action.	Moderate: floods.
61B Millrock	Severe: floods, cutbanks cave.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
62B Monongahela	Moderate: wetness.	Severe: frost action.	Moderate: wetness.	Severe: frost action.	Severe: frost action.	Slight.
62C Monongahela	Moderate: slope, wetness.	Severe: frost action.	Moderate: slope, wetness.	Severe: slope, frost action.	Severe: frost action.	Moderate: slope.
63B Monongahela	Moderate: small stones, wetness.	Severe: frost action.	Moderate: wetness.	Severe: frost action.	Severe: frost action.	Moderate: small stones.
63C Monongahela	Moderate: slope, small stones.	Severe: frost action.	Moderate: slope, wetness.	Severe: slope, frost action.	Severe: frost action.	Moderate: slope, small stones.
64C Nixa	Severe: small stones.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Severe: small stones.
64D Nixa	Severe: slope, small stones.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
65E[1]: Opequon	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock, low strength.	Severe: slope, depth to rock, low strength.	Severe: slope.
Rock outcrop.						
66 Philo	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods.	Moderate: floods.
66X[1]. Pits and dumps						

See footnote at end of table.

TABLE 6.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
67 Purdy	Severe: wetness, too clayey.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, low strength.	Severe: wetness.
[1]68E: Rock outcrop.						
Chilhowie	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
[1]69F: Rock outcrop.						
Drall	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
[1]70C: Rock outcrop.						
Frederick	Severe: too clayey.	Moderate: slope, low strength.	Moderate: slope, low strength.	Severe: slope.	Severe: low strength.	Moderate: slope.
[1]70E: Rock outcrop.						
Frederick	Severe: slope, too clayey.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
[1]71. Rubble land						
72F Rushtown	Severe: slope, small stones.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
73B2 Sequoia	Moderate: too clayey, depth to rock.	Moderate: shrink-swell, low strength.	Moderate: depth to rock, shrink-swell, low strength.	Moderate: slope, shrink-swell, low strength.	Severe: low strength.	Moderate: depth to rock.
73C2 Sequoia	Moderate: too clayey, slope, depth to rock.	Moderate: shrink-swell, slope, low strength.	Moderate: slope, shrink-swell, depth to rock.	Severe: slope.	Severe: low strength.	Moderate: slope, depth to rock.
[1]74B2: Sequoia	Moderate: too clayey, depth to rock.	Moderate: shrink-swell, low strength.	Moderate: depth to rock, shrink-swell, low strength.	Moderate: slope, shrink-swell, low strength.	Severe: low strength.	Moderate: depth to rock.
Berks	Moderate: depth to rock.	Slight	Moderate: depth to rock.	Moderate: slope.	Slight	Moderate: depth to rock, small stones.
[1]74C2: Sequoia	Moderate: too clayey, slope, depth to rock.	Moderate: shrink-swell, slope, low strength.	Moderate: slope, shrink-swell, depth to rock.	Severe: slope.	Severe: low strength.	Moderate: slope, depth to rock.
Berks	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope.	Moderate: slope, depth to rock, small stones.
[1]74D2: Sequoia.						

See footnote at end of table.

TABLE 6.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
[1]74D2:						
Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
75B2: Shenval	Severe: too clayey.	Moderate: low strength.	Moderate: low strength.	Moderate: slope, low strength.	Severe: low strength.	Slight.
75C2: Shenval	Severe: too clayey.	Moderate: slope, low strength.	Moderate: slope, low strength.	Severe: slope.	Severe: low strength.	Moderate: slope.
75D2: Shenval	Severe: slope, too clayey.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
76C: Shenval	Severe: too clayey.	Moderate: slope, low strength.	Moderate: slope, low strength.	Severe: slope.	Severe: low strength.	Severe: small stones.
76D: Shenval	Severe: slope, too clayey.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope, small stones.
77C: Sherando	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
77D: Sherando	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
78C: Sherando	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: small stones.
78E: Sherando	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
79B, 80B: Timberville	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
81: Tioga	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods, frost action.	Slight.
[1]82. Udifluvents						
[1]83, [1]84, [1]85. Udorthents						
86B: Unison	Severe: too clayey.	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: slope, low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Slight.
86C2: Unison	Severe: too clayey.	Moderate: slope, low strength, shrink-swell.	Moderate: slope, low strength, shrink-swell.	Severe: slope.	Moderate: slope, low strength, shrink-swell.	Moderate: slope.
86D2: Unison	Severe: slope, too clayey.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
87B: Unison	Severe: too clayey.	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: slope, low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Severe: small stones.

See footnote at end of table.

TABLE 6.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
87C: Unison	Severe: too clayey.	Moderate: slope, low strength, shrink-swell.	Moderate: slope, low strength, shrink-swell.	Severe: slope.	Moderate: slope, low strength, shrink-swell.	Severe: small stones.
87E: Unison	Severe: slope, too clayey.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
[1]88. Urban land						
89D3, 89E3, 89F3: Weikert	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
[1]90D2, [1]90E3:						
Weikert	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
91B: Wheeling	Moderate: floods, wetness.	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods, frost action.	Slight.
91C2: Wheeling	Moderate: slope, floods, wetness.	Severe: floods.	Severe: floods.	Severe: slope, floods.	Moderate: slope, floods, frost action.	Moderate: slope.
92B: Wheeling	Moderate: floods, wetness.	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods, frost action.	Moderate: small stones.
92C2: Wheeling	Moderate: slope, floods, wetness.	Severe: floods.	Severe: floods.	Severe: slope, floods.	Moderate: slope, floods, frost action.	Moderate: slope, small stones.

[1]See the map unit description for the composition and behavior of the entire unit.

TABLE 7.--SANITARY FACILITIES

[Some of the terms used in this table to describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms used to rate soils. Absence of an entry means the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1B: Allegheny	Slight	Moderate: slope, seepage.	Slight	Slight	Good.
[1]2B: Allegheny	Slight	Moderate: seepage, slope.	Slight	Slight	Fair: small stones.
[1]3B:					
Allegheny	Slight	Moderate: slope, seepage.	Slight	Slight	Good.
Cotaco	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey.
[1]3C:					
Allegheny	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.	Fair: slope.
Cotaco	Severe: wetness.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.	Fair: slope.
[1]4B:					
Allegheny	Slight	Moderate: seepage, slope.	Slight	Slight	Fair: small stones.
Cotaco	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: small stones.
[1]4C:					
Allegheny	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.	Fair: slope, small stones.
Cotaco	Severe: wetness.	Severe: wetness, slope.	Severe: wetness.	Severe: wetness.	Fair: small stones, slope.
[1]5. Aqualfs					
[1]6. Aquents					
7: Atkins	Severe: floods, wetness.	Severe: floods, wetness, seepage.	Severe: floods, wetness, seepage.	Severe: floods, wetness, seepage.	Poor: wetness.
8D: Berks	Severe: slope, depth to rock.	Severe: slope, seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: slope, seepage.	Poor: slope, small stones.
8E, 8F: Berks	Severe: slope, depth to rock.	Severe: slope, seepage, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage.	Poor: slope, small stones.

See footnote at end of table.

TABLE 7.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
[1]9B2:					
Berks	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: small stones.
Weikert	Severe: depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: thin layer.
[1]9C2:					
Berks	Severe: depth to rock.	Severe: slope, seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: small stones.
Weikert	Severe: depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: thin layer.
10B2 Bookwood	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, seepage.	Severe: seepage.	Fair: small stones, area reclaim.
10C2 Bookwood	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage.	Fair: slope, small stones, area reclaim.
10D2 Bookwood	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, seepage.	Severe: slope, seepage.	Poor: slope.
10E2 Bookwood	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage.	Poor: slope.
11A Buchanan	Severe: percs slowly, wetness.	Moderate: seepage.	Moderate: wetness.	Moderate: wetness.	Good.
11B Buchanan	Severe: percs slowly, wetness.	Moderate: slope, seepage.	Moderate: wetness.	Moderate: wetness.	Good.
12B Buchanan	Severe: percs slowly, wetness.	Moderate: slope, seepage.	Moderate: wetness.	Moderate: wetness.	Fair: small stones.
[1]13C:					
Buchanan	Severe: percs slowly, wetness.	Severe: slope.	Moderate: wetness.	Moderate: slope, wetness.	Fair: slope.
Monongahela	Severe: percs slowly, wetness.	Severe: slope.	Moderate: wetness.	Moderate: slope, wetness.	Fair: slope.
14 Buckton	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Good.
15B Burketown	Severe: percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Good.
15C Burketown	Severe: percs slowly.	Severe: wetness, slope.	Severe: wetness.	Severe: wetness.	Fair: slope.

See footnote at end of table.

TABLE 7.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
16E, 16F: Cataska	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope, thin layer, small stones.
17E: Cataska	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, slope, seepage.	Severe: slope, seepage.	Poor: slope.
18: Chagrin	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Good.
19: Chavies	Moderate: floods.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Good.
20B2: Chilhowie	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock.	Slight	Poor: too clayey.
20C2: Chilhowie	Severe: depth to rock, percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: slope.	Poor: too clayey.
21B3: Chilhowie	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock.	Slight	Poor: too clayey.
21C3: Chilhowie	Severe: depth to rock, percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: slope.	Poor: too clayey.
21D3: Chilhowie	Severe: slope.	Severe: slope.	Severe: depth to rock.	Severe: slope.	Poor: slope.
21E3: Chilhowie	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
[1]22B2:					
Chilhowie	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock.	Slight	Poor: too clayey.
Edom	Severe: depth to rock.	Moderate: slope, depth to rock, seepage.	Severe: too clayey.	Slight	Poor: too clayey.
[1]22C2:					
Chilhowie	Severe: depth to rock, percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: slope.	Poor: too clayey.
Edom	Severe: depth to rock.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
[1]22D2:					
Chilhowie	Severe: slope.	Severe: slope.	Severe: depth to rock.	Severe: slope.	Poor: slope.
Edom	Severe: slope, depth to rock.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope, too clayey.
[1]23C3:					
Chilhowie	Severe: depth to rock, percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: slope.	Poor: too clayey.

See footnote at end of table.

TABLE 7.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
[1]23C3:					
Edom	Severe: depth to rock.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
[1]23E3:					
Chilhowie	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Edom	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope, too clayey.
24B2 Christian	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Fair: too clayey.
24C2 Christian	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: slope, too clayey.
24D2 Christian	Severe: slope.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope.
24E2 Christian	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope.
25C2 Christian	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: slope, too clayey.
25D2 Christian	Severe: slope.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope.
26 Cotaco Variant	Severe: percs slowly, wetness.	Slight	Severe: too clayey.	Severe: wetness.	Poor: too clayey.
27, 28 Craigsville	Severe: floods.	Severe: seepage.	Severe: floods, seepage.	Severe: floods, seepage.	Poor: small stones.
29E, 29F Drall	Severe: slope, seepage.	Severe: slope, seepage.	Severe: slope.	Severe: slope, seepage.	Poor: slope, small stones.
30B2 Edom	Severe: depth to rock.	Moderate: slope, depth to rock, seepage.	Severe: too clayey.	Slight	Poor: too clayey.
30C2 Edom	Severe: depth to rock.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
30D2 Edom	Severe: slope, depth to rock.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope, too clayey.
31B3 Edom	Severe: depth to rock.	Moderate: slope, depth to rock, seepage.	Severe: too clayey.	Slight	Poor: too clayey.
31C3 Edom	Severe: depth to rock.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.

See footnote at end of table.

TABLE 7.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
[1]32C2:					
Edom	Severe: depth to rock.	Severe: slope.	Severe: too clayey.	Slight	Poor: too clayey.
Rock outcrop.					
[1]32E2:					
Edom	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope, too clayey.
Rock outcrop.					
33E Elliber	Severe: slope.	Severe: slope, seepage.	Severe: slope, seepage.	Severe: slope, seepage.	Poor: slope, small stones.
[1]34F:					
Elliber	Severe: slope.	Severe: slope, seepage.	Severe: slope, seepage.	Severe: slope, seepage.	Poor: slope, small stones.
Jefferson	Severe: slope.	Severe: slope, seepage.	Severe: slope, seepage.	Severe: slope, seepage.	Poor: slope.
35B2 Endcav	Severe: percs slowly.	Moderate: slope, depth to rock.	Severe: depth to rock, too clayey.	Slight	Poor: too clayey.
35C2 Endcav	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: slope.	Poor: too clayey.
36B2 Endcav	Severe: percs slowly.	Moderate: slope, depth to rock.	Severe: depth to rock, too clayey.	Slight	Poor: too clayey.
[1]37C2:					
Endcav	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: slope.	Poor: too clayey.
Rock outcrop.					
38B Ernest	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Fair: thin layer.
38C Ernest	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Severe: wetness.	Fair: thin layer.
[1]39. Fluvaquents					
[1]40B2:					
Frederick	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Fair: too clayey.
Christian	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Fair: too clayey.

See footnote at end of table.

TABLE 7.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
140C2:					
Frederick	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: slope, too clayey.
Christian	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: slope, too clayey.
140D2:					
Frederick	Severe: slope.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope.
Christian	Severe: slope.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope.
140E2:					
Frederick	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope.
Christian	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope.
141B3:					
Frederick	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Fair: too clayey.
Christian	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Fair: too clayey.
141C3:					
Frederick	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: slope, too clayey.
Christian	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: slope, too clayey.
141D3:					
Frederick	Severe: slope.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope.
Christian	Severe: slope.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope.
142B2:					
Frederick	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Fair: too clayey.
Christian	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Fair: too clayey.
142C2:					
Frederick	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: slope, too clayey.
Christian	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: slope, too clayey.

Map symbols carry footnote marker [1].

See footnote at end of table.

TABLE 7.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
[1]42D2:					
Frederick	Severe: slope.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope.
Christian	Severe: slope.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope.
[1]42E2:					
Frederick	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope.
Christian	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope.
[1]43C:					
Frederick	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: slope, too clayey.
Christian	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: slope, too clayey.
[1]43D, [1]43E:					
Frederick	Severe: slope.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope.
Christian	Severe: slope.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope.
[1]44B2:					
Frederick	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Fair: too clayey.
Christian	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Fair: too clayey.
[1]44C2:					
Frederick	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: slope, too clayey.
Christian	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: slope, too clayey.
[1]44D2:					
Frederick	Severe: slope.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope.
Christian	Severe: slope.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope.
[1]44E2:					
Frederick	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope.
Christian	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope.

See footnote at end of table.

TABLE 7.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
[1]45C2:					
Frederick	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: slope, too clayey.
Rock outcrop.					
[1]45E2:					
Frederick	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope.
Rock outcrop.					
[1]46B:					
Frederick	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Fair: too clayey.
Nixa	Severe: percs slowly.	Severe: small stones.	Severe: small stones.	Slight	Poor: small stones.
[1]46C:					
Frederick	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: slope, too clayey.
Nixa	Severe: percs slowly.	Severe: slope, small stones.	Severe: small stones.	Moderate: slope.	Poor: small stones.
47C Guernsey	Severe: percs slowly, wetness.	Moderate: slope.	Severe: too clayey, wetness.	Moderate: wetness.	Poor: too clayey.
48E, [1]49F Hartleton	Severe: slope.	Severe: slope, seepage.	Severe: slope, seepage, depth to rock.	Severe: slope, seepage.	Poor: slope, small stones.
50D Hazleton	Severe: slope.	Severe: slope, seepage.	Severe: seepage.	Severe: slope, seepage.	Poor: slope, small stones.
50E Hazleton	Severe: slope.	Severe: slope, seepage.	Severe: slope, seepage.	Severe: slope, seepage.	Poor: slope, small stones.
[1]51D Hazleton	Severe: slope.	Severe: slope, seepage.	Severe: seepage, large stones.	Severe: slope, seepage.	Poor: slope, small stones, large stones.
[1]51F Hazleton	Severe: slope.	Severe: slope, seepage.	Severe: slope, seepage, large stones.	Severe: slope, seepage.	Poor: slope, small stones, large stones.
[1]52F:					
Hazleton	Severe: slope.	Severe: slope, seepage.	Severe: slope, seepage, large stones.	Severe: slope, seepage.	Poor: slope, small stones, large stones.
Lehew	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.

See footnote at end of table.

TABLE 7.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
53C----------------- Jefferson	Moderate: slope, depth to rock.	Severe: slope, seepage.	Severe: seepage.	Severe: seepage.	Fair: slope, small stones.
53D----------------- Jefferson	Severe: slope.	Severe: slope, seepage.	Severe: seepage.	Severe: slope, seepage.	Poor: slope.
54C----------------- Leetonia	Severe: depth to rock.	Severe: slope.	Severe: depth to rock.	Severe: seepage.	Poor: small stones.
54E----------------- Leetonia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
55D, 56D------------ Lehew	Severe: slope.	Severe: slope.	Severe: depth to rock.	Severe: slope.	Poor: slope.
57E, 57F------------ Lehew	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
58D----------------- Lew	Severe: slope.	Severe: slope, small stones, seepage.	Moderate: too clayey, large stones.	Severe: slope.	Poor: slope, small stones.
59E, 59F------------ Lew	Severe: slope.	Severe: slope, small stones, seepage.	Severe: slope.	Severe: slope.	Poor: slope, small stones.
60------------------ Massanetta	Severe: wetness, floods.	Severe: wetness, floods.	Severe: floods, wetness.	Severe: wetness, floods.	Good.
61B----------------- Millrock	Severe: floods.	Severe: floods, seepage.	Severe: floods, seepage.	Severe: floods, seepage.	Fair: too sandy.
62B----------------- Monongahela	Severe: percs slowly, wetness.	Moderate: slope, seepage.	Moderate: wetness.	Moderate: wetness.	Good.
62C----------------- Monongahela	Severe: percs slowly, wetness.	Severe: slope.	Moderate: wetness.	Moderate: slope, wetness.	Fair: slope.
63B----------------- Monongahela	Severe: percs slowly, wetness.	Moderate: slope, seepage.	Moderate: wetness.	Moderate: wetness.	Fair: small stones.
63C----------------- Monongahela	Severe: percs slowly, wetness.	Severe: slope.	Moderate: wetness.	Moderate: slope, wetness.	Fair: slope, small stones.
64C----------------- Nixa	Severe: percs slowly.	Severe: slope, small stones.	Severe: small stones.	Moderate: slope.	Poor: small stones.
64D----------------- Nixa	Severe: slope, percs slowly.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.	Poor: slope, small stones.
[1]65E: Opequon------------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Poor: slope, thin layer, too clayey.
Rock outcrop.					

See footnote at end of table.

TABLE 7.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
66: Philo	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, seepage.	Severe: floods.	Good.
[1]66X. Pits and dumps					
67: Purdy	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: wetness, too clayey.
[1]68E: Rock outcrop.					
Chilhowie	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
[1]69F: Rock outcrop.					
Drall	Severe: slope, seepage.	Severe: slope, seepage.	Severe: slope.	Severe: slope, seepage.	Poor: slope, small stones.
[1]70C: Rock outcrop.					
Frederick	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: slope, too clayey.
[1]70E: Rock outcrop.					
Frederick	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope.
[1]71. Rubble land					
72F: Rushtown	Severe: slope.	Severe: slope, seepage, small stones.	Severe: slope, seepage, small stones.	Severe: slope, seepage.	Poor: slope, small stones.
73B2: Sequoia	Severe: percs slowly.	Moderate: slope.	Severe: too clayey, depth to rock.	Slight	Fair: too clayey, thin layer.
73C2: Sequoia	Severe: percs slowly.	Severe: slope.	Severe: too clayey, depth to rock.	Moderate: slope.	Fair: too clayey, thin layer, slope.
[1]74B2: Sequoia	Severe: percs slowly.	Moderate: slope.	Severe: too clayey, depth to rock.	Slight	Fair: too clayey, thin layer.
Berks	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: small stones.

See footnote at end of table.

TABLE 7.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
[1]74C2:					
Sequoia	Severe: percs slowly.	Severe: slope.	Severe: too clayey, depth to rock.	Moderate: slope.	Fair: too clayey, thin layer, slope.
Berks	Severe: depth to rock.	Severe: slope, seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: small stones.
[1]74D2:					
Sequoia	Severe: slope, percs slowly.	Severe: slope.	Severe: too clayey, depth to rock.	Severe: slope.	Severe: slope, too clayey, thin layer.
Berks	Severe: depth to rock, slope.	Severe: slope, seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage, slope.	Poor: small stones, slope.
75B2: Shenval	Moderate: percs slowly.	Moderate: slope, seepage.	Severe: too clayey.	Slight	Poor: too clayey, area reclaim.
75C2: Shenval	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, area reclaim.
75D2: Shenval	Severe: slope.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope, too clayey, area reclaim.
76C: Shenval	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, area reclaim.
76D: Shenval	Severe: slope.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope, too clayey, area reclaim.
77C: Sherando	Moderate: slope.	Severe: slope, seepage.	Severe: slope, seepage.	Severe: seepage.	Poor: small stones.
77D: Sherando	Severe: slope.	Severe: slope, seepage.	Severe: slope, seepage.	Severe: seepage.	Poor: slope, small stones.
78C: Sherando	Moderate: slope.	Severe: slope, seepage.	Severe: slope, seepage.	Severe: seepage.	Poor: small stones.
78E: Sherando	Severe: slope.	Severe: slope, seepage.	Severe: slope, seepage.	Severe: slope, seepage.	Poor: slope, small stones.
79B, 80B: Timberville	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Fair: small stones, thin layer.
81: Tioga	Severe: floods.	Severe: floods, seepage.	Severe: floods, seepage.	Severe: floods, seepage.	Good.

See footnote at end of table.

TABLE 7.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
[1]82. Udifluvents					
[1]83, [1]84, [1]85. Udorthents					
86B----------------- Unison	Moderate: percs slowly.	Moderate: slope, seepage.	Severe: too clayey.	Slight-----------	Poor: too clayey, area reclaim.
86C2---------------- Unison	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, area reclaim.
86D2---------------- Unison	Severe: slope.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope, too clayey, area reclaim.
87B----------------- Unison	Moderate: percs slowly.	Moderate: slope, seepage.	Severe: too clayey.	Slight-----------	Poor: too clayey, area reclaim.
87C----------------- Unison	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, area reclaim.
87E----------------- Unison	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope, too clayey, area reclaim.
[1]88. Urban land					
89D3---------------- Weikert	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: slope, seepage.	Poor: slope, thin layer.
89E3, 89F3---------- Weikert	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage.	Poor: slope, thin layer.
[1]90D2:					
Weikert------------	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: slope, seepage.	Poor: slope, thin layer.
Berks--------------	Severe: depth to rock, slope.	Severe: slope, seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage, slope.	Poor: small stones, slope.
[1]90E3:					
Weikert------------	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage.	Poor: slope, thin layer.
Berks--------------	Severe: depth to rock, slope.	Severe: slope, seepage, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: seepage, slope.	Poor: small stones, slope.

See footnote at end of table.

TABLE 7.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
91B: Wheeling	Moderate: wetness, floods, seepage.	Severe: floods.	Severe: seepage, wetness.	Moderate: wetness, floods.	Good.
91C2: Wheeling	Moderate: slope, wetness, floods.	Severe: slope, floods.	Severe: seepage, wetness.	Moderate: slope, wetness, floods.	Fair: slope.
92B: Wheeling	Moderate: wetness, floods, seepage.	Severe: floods.	Severe: seepage, wetness.	Moderate: wetness, floods.	Fair: small stones.
92C2: Wheeling	Moderate: slope, wetness, floods.	Severe: slope, floods.	Severe: seepage, wetness.	Moderate: slope, wetness, floods.	Fair: slope, small stones.

[1] See the map unit description for the composition and behavior of the entire unit.

TABLE 8.--CONSTRUCTION MATERIALS

[Some of the terms used in this table to describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and "poor." Absence of an entry means the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1B Allegheny	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
[1]2B Allegheny	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
[1]3B:				
Allegheny	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
Cotaco	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
[1]3C:				
Allegheny	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
Cotaco	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope.
[1]4B, [1]4C:				
Allegheny	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
Cotaco	Fair: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
[1]5. Aqualfs				
[1]6. Aquents				
7 Atkins	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
8D, 8E, 8F Berks	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones.
[1]9B2, [1]9C2:				
Berks	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
Weikert	Fair: frost action.	Unsuited: excess fines.	Poor: excess fines, thin layer.	Poor: small stones, thin layer.
10B2 Bookwood	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
10C2 Bookwood	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
10D2 Bookwood	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 8.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
10E2: Bookwood	Poor: low strength, slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
11A, 11B: Buchanan	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
12B: Buchanan	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
[1]13C:				
Buchanan	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
Monongahela	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
14: Buckton	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
15B: Burketown	Fair: frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
15C: Burketown	Fair: frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope.
16E, 16F: Cataska	Poor: slope, depth to rock.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones.
17E: Cataska	Poor: slope, thin layer.	Unsuited	Poor: excess fines.	Poor: large stones, slope.
18: Chagrin	Fair: low strength.	Unsuited	Unsuited	Good.
19: Chavies	Fair: low strength.	Poor: excess fines.	Unsuited: excess fines.	Good.
20B2, 20C2, 21B3, 21C3: Chilhowie	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey.
21D3: Chilhowie	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
21E3: Chilhowie	Poor: slope, thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
[1]22B2:				
Chilhowie	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey.
Edom	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
[1]22C2:				
Chilhowie	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey.
Edom	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, too clayey.

See footnote at end of table.

TABLE 8.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
[1]22D2:				
Chilhowie	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Edom	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
[1]23C3:				
Chilhowie	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey.
Edom	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, too clayey.
[1]23E3:				
Chilhowie	Poor: slope, thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Edom	Poor: slope, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
24B2 Christian	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
24C2 Christian	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
24D2 Christian	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
24E2 Christian	Poor: slope, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
25C2 Christian	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
25D2 Christian	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
26 Cotaco Variant	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
27 Craigsville	Fair: frost action.	Poor: excess fines.	Poor: excess fines.	Fair: thin layer, small stones.
28 Craigsville	Fair: frost action.	Poor: excess fines.	Poor: excess fines.	Poor: small stones.
29E, 29F Drall	Poor: slope.	Fair	Fair	Poor: slope, too sandy, large stones.
30B2 Edom	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
30C2 Edom	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, too clayey.
30D2 Edom	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 8.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
31B3: Edom	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
31C3: Edom	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, too clayey.
[1]32C2:				
Edom	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
Rock outcrop.				
[1]32E2:				
Edom	Poor: slope, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Rock outcrop.				
33E: Elliber	Poor: slope.	Unsuited	Poor	Poor: slope, small stones.
[1]34F:				
Elliber	Poor: slope.	Unsuited	Poor	Poor: slope, small stones.
Jefferson	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones.
35B2, 35C2, 36B2: Endcav	Poor: shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.
[1]37C2:				
Endcav	Poor: shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.
Rock outcrop.				
38B: Ernest	Fair: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
38C: Ernest	Fair: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope.
[1]39. Fluvaquents				
[1]40B2:				
Frederick	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
Christian	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
[1]40C2:				
Frederick	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
Christian	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.

See footnote at end of table.

TABLE 8.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
[1]40D2:				
Frederick	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Christian	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
[1]40E2:				
Frederick	Poor: slope, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Christian	Poor: slope, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
[1]41B3:				
Frederick	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey, thin layer.
Christian	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey, thin layer.
[1]41C3:				
Frederick	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, too clayey, thin layer.
Christian	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, too clayey, thin layer.
[1]41D3:				
Frederick	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Christian	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
[1]42B2, [1]42C2:				
Frederick	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
Christian	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
[1]42D2:				
Frederick	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Christian	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
[1]42E2:				
Frederick	Poor: slope, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Christian	Poor: slope, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 8.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
[1]43C:				
Frederick	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
Christian	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
[1]43D, [1]43E:				
Frederick	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Christian	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
[1]44B2:				
Frederick	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
Christian	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
[1]44C2:				
Frederick	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
Christian	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
[1]44D2:				
Frederick	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Christian	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
[1]44E2:				
Frederick	Poor: slope, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Christian	Poor: slope, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
[1]45C2:				
Frederick	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
Rock outcrop.				
[1]45E2:				
Frederick	Poor: slope, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Rock outcrop.				
[1]46B, [1]46C:				
Frederick	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
Nixa	Fair: low strength.	Unsuited: excess fines.	Poor: excess fines.	Poor: small stones.

See footnote at end of table.

TABLE 8.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
47C-------------------- Guernsey	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: small stones.
48E-------------------- Hartleton	Poor: slope.	Unsuited: excess fines.	Poor: excess fines, thin layer.	Poor: slope, small stones.
[1]49F------------------ Hartleton	Poor: slope.	Unsuited: excess fines.	Poor: excess fines, thin layer.	Poor: slope, small stones, large stones.
50D-------------------- Hazleton	Fair: slope, frost action.	Poor	Poor	Poor: slope, large stones.
50E-------------------- Hazleton	Severe: slope.	Poor	Poor	Poor: slope, large stones.
[1]51D------------------ Hazleton	Fair: slope, frost action, large stones.	Poor	Poor	Poor: slope, large stones.
[1]51F------------------ Hazleton	Severe: slope.	Poor	Poor	Poor: slope, large stones.
[1]52F:				
Hazleton-------------	Severe: slope.	Poor	Poor	Poor: slope, large stones.
Lehew----------------	Poor: slope.	Poor	Poor	Poor: slope.
53C-------------------- Jefferson	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
53D-------------------- Jefferson	Fair: slope, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones.
54C-------------------- Leetonia	Good	Fair	Fair	Poor: large stones, too sandy.
54E-------------------- Leetonia	Poor: slope.	Fair	Fair	Poor: slope.
55D, 56D--------------- Lehew	Poor: thin layer.	Poor	Poor	Poor: slope.
57E, 57F--------------- Lehew	Poor: slope.	Poor	Poor	Poor: slope.
58D-------------------- Lew	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Severe: slope, large stones, small stones.
59E, 59F--------------- Lew	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Severe: slope, large stones, small stones.

See footnote at end of table.

TABLE 8.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
60: Massanetta	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
61B: Millrock	Good	Fair: excess fines, small stones.	Unsuited: excess fines.	Poor: too sandy.
62B: Monongahela	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
62C: Monongahela	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
63B, 63C: Monongahela	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
64C: Nixa	Fair: low strength.	Unsuited: excess fines.	Poor: excess fines.	Poor: small stones.
64D: Nixa	Fair: low strength.	Unsuited: excess fines.	Poor: excess fines.	Poor: small stones.
[1]65E:				
Opequon	Poor: slope, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, too clayey.
Rock outcrop.				
66: Philo	Fair: low strength.	Poor	Unsuited	Good.
[1]66X. Pits and dumps				
67: Purdy	Poor: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
[1]68E:				
Rock outcrop.				
Chilhowie	Poor: slope, thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
[1]69F:				
Rock outcrop.				
Drall	Poor: slope.	Fair	Fair	Poor: slope, too sandy, large stones.
[1]70C:				
Rock outcrop.				
Frederick	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
[1]70E:				
Rock outcrop.				
Frederick	Poor: slope, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 8.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
[1]71. Rubble land				
72F: Rushtown	Poor: slope.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope, small stones.
73B2, 73C2: Sequoia	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer, too clayey.
[1]74B2, [1]74C2:				
Sequoia	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer, too clayey.
Berks	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
[1]74D2:				
Sequoia	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer, too clayey.
Berks	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones, slope.
75B2, 75C2: Shenval	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: thin layer.
75D2: Shenval	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, thin layer.
76C: Shenval	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
76D: Shenval	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones.
77C: Sherando	Good	Poor: excess fines.	Poor: excess fines.	Fair: small stones.
77D: Sherando	Fair: slope.	Poor: excess fines.	Poor: excess fines.	Poor: slope.
78C: Sherando	Good	Poor: excess fines.	Poor: excess fines.	Poor: small stones.
78E: Sherando	Poor: slope.	Poor: excess fines.	Poor: excess fines.	Poor: slope, small stones.
79B: Timberville	Fair: low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: small stones, thin layer.
80B: Timberville	Fair: low strength, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
81: Tioga	Fair: frost action.	Unsuited: excess fines.	Poor: excess fines.	Good.
[1]82. Udifluvents				

See footnote at end of table.

TABLE 8.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
[1]83, [1]84, [1]85. Udorthents				
86B: Unison	Poor: low strength, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
86C2: Unison	Poor: low strength, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: slope, thin layer.
86D2: Unison	Poor: low strength, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
87B, 87C: Unison	Poor: low strength, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
87E: Unison	Poor: slope, low strength, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope, small stones.
[1]88. Urban land				
89D3: Weikert	Fair: slope, frost action.	Unsuited: excess fines.	Poor	Poor: slope.
89E3, 89F3: Weikert	Poor: slope.	Unsuited: excess fines.	Poor	Poor: slope.
[1]90D2:				
Weikert	Fair: slope, frost action.	Unsuited: excess fines.	Poor	Poor: slope.
Berks	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones, slope.
[1]90E3:				
Weikert	Poor: slope.	Unsuited: excess fines.	Poor	Poor: slope.
Berks	Poor: thin layer.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones, slope.
91B: Wheeling	Fair: frost action.	Unsuited	Fair	Good.
91C2: Wheeling	Fair: frost action.	Unsuited	Fair	Fair: slope.
92B, 92C2: Wheeling	Fair: frost action.	Unsuited	Fair	Poor: small stones.

[1]See the map unit description for the composition and behavior of the entire unit.

TABLE 9.--WATER MANAGEMENT

[Some of the terms used in this table to describe restrictive soil features are defined in the Glossary. Absence of an entry means the soil was not evaluated]

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
1B, [1]2B: Allegheny	Slope, seepage.	Piping, low strength.	Not needed	Slope, piping.	Slope.
[1]3B, [1]3C:					
Allegheny	Slope, seepage.	Piping, low strength.	Not needed	Slope, piping.	Slope.
Cotaco	Seepage	Low strength, piping.	Favorable	Slope	Slope, erodes easily.
[1]4B, [1]4C:					
Allegheny	Slope, seepage.	Piping, low strength.	Not needed	Slope, piping.	Slope.
Cotaco	Seepage	Low strength, piping.	Slope	Slope, wetness.	Slope.
[1]5. Aqualfs					
[1]6. Aquents					
7: Atkins	Seepage, wetness.	Piping, floods.	Floods, wetness.	Not needed	Wetness, floods.
8D, 8E, 8F: Berks	Depth to rock	Seepage, thin layer, piping.	Not needed	Depth to rock	Depth to rock, droughty.
[1]9B2, [1]9C2:					
Berks	Depth to rock	Piping	Not needed	Depth to rock	Depth to rock, droughty.
Weikert	Seepage, slope.	Thin layer, low strength, seepage.	Not needed	Depth to rock, rooting depth.	Depth to rock, rooting depth, droughty.
10B2, 10C2, 10D2, 10E2: Bookwood	Slope, depth to rock.	Low strength	Not needed	Slope, erodes easily.	Slope, erodes easily.
11A, 11B, 12B: Buchanan	Slope, seepage.	Low strength, piping.	Slope, percs slowly.	Percs slowly, piping, rooting depth.	Slope, percs slowly, erodes easily.
[1]13C:					
Buchanan	Slope, seepage.	Low strength, piping.	Slope, percs slowly.	Percs slowly, piping, rooting depth.	Slope, percs slowly, erodes easily.
Monongahela	Slope, seepage.	Low strength, piping.	Slope, percs slowly.	Percs slowly, piping, rooting depth.	Slope, percs slowly, erodes easily.
14: Buckton	Seepage	Favorable	Not needed	Favorable	Favorable.
15B, 15C: Burketown	Slope	Low strength, piping.	Percs slowly, slope.	Percs slowly, erodes easily, slope.	Erodes easily, percs slowly, rooting depth.

See footnote at end of table.

TABLE 9.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
16E, 16F----------Cataska	Depth to rock-----	Thin layer, piping.	Not needed-------	Slope, depth to rock.	Slope, rooting depth, droughty.
17E---------------Cataska	Favorable---------	Thin layer--------	Not needed-------	Slope, large stones, small stones.	Slope, depth to rock, large stones.
18----------------Chagrin	Seepage-----------	Piping, hard to pack.	Not needed-------	Not needed-------	Not needed.
19----------------Chavies	Seepage, slope.	Piping------------	Not needed-------	Slope------------	Slope.
20B2, 20C2, 21B3, 21C3, 21D3, 21E3-Chilhowie	Depth to rock, slope.	Thin layer, hard to pack.	Not needed-------	Depth to rock----	Percs slowly, droughty.
[1]22B2, [1]22C2, [1]22D2, [1]23C3, [1]23E3:					
Chilhowie-------	Depth to rock, slope.	Thin layer, hard to pack.	Not needed-------	Depth to rock----	Percs slowly, droughty.
Edom------------	Slope-------------	Low strength, compressible.	Not needed-------	Erodes easily, slope.	Erodes easily, slope.
24B2, 24C2, 24D2, 24E2, 25C2, 25D2-Christian	Slope-------------	Compressible, low strength.	Not needed-------	Slope, erodes easily.	Slope, erodes easily.
26----------------Cotaco Variant	Slope-------------	Low strength, hard to pack, compressible.	Percs slowly, slope, wetness.	Percs slowly, slope, wetness.	Percs slowly, slope, wetness.
27, 28------------Craigsville	Seepage-----------	Seepage, piping, erodes easily.	Floods-----------	Erodes easily, piping.	Droughty, erodes easily.
29E, 29F----------Drall	Depth to rock, seepage, large stones.	Seepage, piping, large stones.	Not needed-------	Large stones, too sandy, piping.	Droughty, large stones, slope.
30B2, 30C2, 30D2, 31B3, 31C3-------Edom	Slope-------------	Low strength, compressible.	Not needed-------	Erodes easily, slope.	Erodes easily, slope.
[1]32C2, [1]32E2:					
Edom-------------	Slope-------------	Low strength, compressible.	Not needed-------	Erodes easily, slope.	Erodes easily, slope.
Rock outcrop.					
33E---------------Elliber	Seepage, slope.	Low strength, piping.	Not needed-------	Slope------------	Slope.
[1]34F:					
Elliber----------	Seepage, slope.	Low strength, piping.	Not needed-------	Slope------------	Slope.
Jefferson--------	Seepage, slope.	Seepage, piping.	Not needed-------	Slope, erodes easily.	Slope, erodes easily.
35B2, 35C2, 36B2--Endcav	Depth to rock-----	Hard to pack, compressible.	Not needed-------	Slope, percs slowly.	Slope, percs slowly.

See footnote at end of table.

TABLE 9.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
[1]37C2:					
Endcav	Depth to rock	Hard to pack, compressible.	Not needed	Slope, percs slowly.	Slope, percs slowly.
Rock outcrop.					
38B, 38C Ernest	Slope	Piping, low strength.	Percs slowly, wetness.	Percs slowly, wetness.	Percs slowly, erodes easily.
[1]39. Fluvaquents					
[1]40B2, [1]40C2, [1]40D2, [1]40E2, [1]41B3, [1]41C3, [1]41D3, [1]42B2, [1]42C2, [1]42D2, [1]42E2, [1]43C, [1]43D, [1]43E, [1]44B2, [1]44C2, [1]44D2, [1]44E2:					
Frederick	Slope	Compressible, low strength.	Not needed	Slope, erodes easily.	Slope, erodes easily.
Christian	Slope	Compressible, low strength.	Not needed	Slope, erodes easily.	Slope, erodes easily.
[1]45C2, [1]45E2:					
Frederick	Slope	Compressible, low strength.	Not needed	Slope, erodes easily.	Slope, erodes easily.
Rock outcrop.					
[1]46B, [1]46C:					
Frederick	Slope	Compressible, low strength.	Not needed	Slope, erodes easily.	Slope, erodes easily.
Nixa	Depth to rock	Piping, thin layer.	Not needed	Slope, percs slowly.	Droughty, percs slowly, slope.
47C Guernsey	Favorable	Hard to pack, wetness.	Percs slowly	Erodes easily, wetness.	Erodes easily, percs slowly.
48E Hartleton	Slope, seepage, depth to rock.	Low strength	Not needed	Slope, depth to rock.	Slope, droughty.
[1]49F Hartleton	Slope, seepage, depth to rock.	Low strength, large stones.	Not needed	Slope, depth to rock, large stones.	Slope, droughty, large stones.
50D, 50E, [1]51D, [1]51F Hazleton	Depth to rock, seepage.	Low strength, piping.	Not needed	Slope, large stones.	Slope, large stones.
[1]52F:					
Hazleton	Depth to rock, seepage.	Low strength, piping.	Not needed	Slope, large stones.	Slope, large stones.
Lehew	Depth to rock, seepage.	Piping, seepage, large stones.	Not needed	Depth to rock, large stones.	Droughty, rooting depth, large stones.
53C, 53D Jefferson	Seepage, slope.	Seepage, piping.	Not needed	Slope, erodes easily.	Slope, erodes easily.

See footnote at end of table.

TABLE 9.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
54C, 54E: Leetonia	Large stones, slope.	Seepage, piping, large stones.	Not needed	Depth to rock, large stones, piping.	Droughty, large stones, slope.
55D, 56D, 57E, 57F: Lehew	Depth to rock, seepage.	Piping, seepage.	Not needed	Depth to rock	Droughty, rooting depth.
58D, 59E, 59F: Lew	Slope, seepage.	Shrink-swell, low strength.	Not needed	Slope, large stones.	Slope, large stones.
60: Massanetta	Seepage	Wetness, compressible.	Floods, frost action.	Not needed	Favorable.
61B: Millrock	Seepage	Seepage	Not needed	Not needed	Not needed.
62B, 62C, 63B, 63C: Monongahela	Slope, seepage.	Low strength, piping.	Slope, percs slowly.	Percs slowly, piping, rooting depth.	Slope, percs slowly, erodes easily.
64C, 64D: Nixa	Depth to rock	Piping, thin layer.	Not needed	Slope, percs slowly.	Droughty, percs slowly, slope.
[1]65E:					
Opequon	Depth to rock, slope.	Thin layer, compressible, hard to pack.	Not needed	Depth to rock, slope.	Slope, rooting depth, depth to rock.
Rock outcrop.					
66: Philo	Seepage	Piping	Floods, poor outlets.	Not needed	Not needed.
[1]66X. Pits and dumps					
67: Purdy	Slope	Low strength, compressible.	Percs slowly	Wetness	Wetness.
[1]68E:					
Rock outcrop.					
Chilhowie	Depth to rock, slope.	Thin layer, hard to pack.	Not needed	Depth to rock	Percs slowly, droughty.
[1]69F:					
Rock outcrop.					
Drall	Depth to rock, seepage, large stones.	Seepage, piping, large stones.	Not needed	Large stones, too sandy, piping.	Droughty, large stones, slope.
[1]70C, [1]70E:					
Rock outcrop.					
Frederick	Slope	Compressible, low strength.	Not needed	Slope, erodes easily.	Slope, erodes easily.
[1]71. Rubble land					
72F: Rushtown	Seepage, slope.	Seepage	Not needed	Slope	Droughty, slope.

See footnote at end of table.

TABLE 9.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
73B2, 73C2 Sequoia	Seepage	Compressible	Not needed	Erodes easily, percs slowly, rooting depth.	Erodes easily, percs slowly, rooting depth.
[1]74B2, [1]74C2, [1]74D2:					
Sequoia	Seepage	Compressible	Not needed	Erodes easily, percs slowly, rooting depth.	Erodes easily, percs slowly, rooting depth.
Berks	Depth to rock	Piping	Not needed	Depth to rock	Depth to rock, droughty.
75B2, 75C2, 75D2, 76C, 76D Shenval	Favorable	Compressible, low strength, hard to pack.	Not needed	Slope	Slope.
77C, 77D, 78C, 78E Sherando	Seepage	Seepage, piping.	Not needed	Erodes easily	Erodes easily, droughty.
79B, 80B Timberville	Seepage	Seepage	Not needed	Favorable	Favorable.
81 Tioga	Seepage	Piping, low strength, seepage.	Not needed	Not needed	Favorable.
[1]82. Udifluvents					
[1]83, [1]84, [1]85. Udorthents					
86B, 86C2, 86D2, 87B, 87C, 87E Unison	Slope	Compressible, low strength.	Not needed	Slope	Slope.
[1]88. Urban land					
89D3, 89E3, 89F3 Weikert	Seepage, slope.	Thin layer, low strength, seepage.	Not needed	Depth to rock, rooting depth.	Depth to rock, rooting depth, droughty.
[1]90D2, [1]90E3:					
Weikert	Seepage, slope.	Thin layer, low strength, seepage.	Not needed	Depth to rock, rooting depth.	Depth to rock, rooting depth, droughty.
Berks	Depth to rock	Piping	Not needed	Depth to rock	Depth to rock, droughty.
91B, 91C2, 92B, 92C2 Wheeling	Seepage, slope.	Seepage, piping.	Not needed	Slope, piping.	Slope, erodes easily.

[1]See the map unit description for the composition and behavior of the entire unit.

TABLE 10.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
1B	2o	Slight	Slight	Slight	Slight	Northern red oak	80	Eastern white pine,
Allegheny						Yellow-poplar	90	yellow-poplar,
						Virginia pine	75	black walnut,
						Eastern white pine	90	red pine[1],
						Shortleaf pine	75	Norway spruce[2],
								Scotch pine[2].
[3]2B	2o	Slight	Slight	Slight	Slight	Northern red oak	80	Eastern white pine,
Allegheny						Eastern white pine	90	black walnut,
						Yellow-poplar	75	yellow-poplar,
						Shortleaf pine	90	Scotch pine[2].
						Virginia pine	75	
[3]3B, [3]3C:								
Allegheny	2o	Slight	Slight	Slight	Slight	Northern red oak	80	Eastern white pine,
						Yellow-poplar	90	yellow-poplar,
						Virginia pine	75	black walnut,
						Eastern white pine	90	red pine[1],
						Shortleaf pine	75	Norway spruce[2],
								Scotch pine[2].
Cotaco	2o	Slight	Slight	Slight	Slight	Northern red oak	83	Eastern white pine,
						Yellow-poplar	---	yellow-poplar,
						Virginia pine	---	white oak,
						Shortleaf pine	---	sweetgum,
						Black oak	---	Scotch pine[2].
[3]4B, [3]4C:								
Allegheny	2o	Slight	Slight	Slight	Slight	Northern red oak	80	Eastern white pine,
						Eastern white pine	90	black walnut,
						Yellow-poplar	75	yellow-poplar,
						Shortleaf pine	90	Scotch pine[2].
						Virginia pine	75	
Cotaco	2o	Slight	Slight	Slight	Slight	Northern red oak	83	Eastern white pine,
						Yellow-poplar	---	yellow-poplar,
						Black oak	---	Scotch pine[2].
						Shortleaf pine	---	
7	1w	Slight	Severe	Severe	Moderate	Pin oak	100	Eastern white pine,
Atkins						Sweetgum	95	loblolly pine,
						Eastern cottonwood	105	sweetgum.
8D, 8E	3f	Slight	Moderate	Moderate	Slight	Northern red oak	70	Virginia pine,
Berks						Black oak	70	tamarack,
(north aspect)						Virginia pine	70	Norway spruce,
								red pine[1].
8D, 8E	4F	Slight	Moderate	Moderate	Slight	Northern red oak	60	Virginia pine,
Berks						Black oak	60	tamarack,
(south aspect)						Virginia pine	60	Norway spruce[2],
								red pine[1].
8F	3f	Moderate	Severe	Moderate	Slight	Northern red oak	70	Virginia pine,
Berks						Black oak	70	tamarack,
(north aspect)						Virginia pine	70	Norway spruce[2],
								red pine[1].
8F	4f	Moderate	Severe	Moderate	Slight	Northern red oak	60	Virginia pine,
Berks						Black oak	60	tamarack,
(south aspect)						Virginia pine	60	Norway spruce[2],
								red pine[1].

See footnotes at end of table.

TABLE 10.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
[3]9B2, [3]9C2:								
Berks	3f	Slight	Slight	Moderate	Slight	Northern red oak	70	Virginia pine,
						Black oak	70	tamarack,
						Virginia pine	70	Norway spruce[2],
								red pine[1].
Weikert	4d	Slight	Slight	Severe	Moderate	Northern red oak	59	Virginia pine,
						Virginia pine	56	shortleaf pine,
								red pine[1].
10B2, 10C2	2o	Slight	Slight	Slight	Slight	Northern red oak	80	Yellow-poplar,
Bookwood						Yellow-poplar	85	eastern white pine,
						Virginia pine	70	loblolly pine,
						White pine	85	black walnut.
10D2	2r	Moderate	Moderate	Slight	Slight	Northern red oak	80	Yellow-poplar,
Bookwood						Yellow-poplar	85	eastern white pine,
						Virginia pine	70	loblolly pine,
						White pine	85	black walnut.
10E2	2r	Severe	Severe	Slight	Slight	Northern red oak	80	Yellow-poplar,
Bookwood						Yellow-poplar	85	eastern white pine,
						Virginia pine	70	loblolly pine,
						White pine	85	black walnut.
11A, 11B, 12B	3w	Slight	Moderate	Slight	Slight	Northern red oak	70	Eastern white pine,
Buchanan						Yellow-poplar	85	loblolly pine,
						Eastern white pine	72	Virginia pine,
						Virginia pine	77	yellow-poplar,
								black cherry.
[3]13C:								
Buchanan	3w	Moderate	Moderate	Slight	Slight	Northern red oak	70	Eastern white pine,
						Yellow-poplar	85	loblolly pine,
						Eastern white pine	72	Virginia pine,
						Virginia pine	77	yellow-poplar,
								black cherry.
Monongahela	3w	Moderate	Moderate	Slight	Slight	Northern red oak	70	Eastern white pine,
						Yellow-poplar	85	loblolly pine,
						Eastern white pine	72	Virginia pine,
						Virginia pine	77	yellow-poplar,
							82	black cherry.
14	2o	Slight	Slight	Slight	Slight	Yellow-poplar	95	Eastern white pine,
Buckton						Northern red oak	80	black walnut,
						White ash	---	yellow-poplar,
								white ash,
								Scotch pine[2].
15B, 15C	3w	Slight	Moderate	Slight	Slight	Northern red oak	70	Eastern white pine,
Burketown						Virginia pine	70	loblolly pine,
						Eastern white pine	70	Virginia pine,
						Yellow-poplar	80	yellow-poplar.
16E, 16F, 17E	5f	Moderate	Moderate	Severe	Severe	Chestnut oak	50	Pitch pine,
Cataska						Scarlet oak	50	Virginia pine.
						Pitch pine	50	
18	1o	Slight	Slight	Slight	Slight	Northern red oak	85	Eastern white pine,
Chagrin						Yellow-poplar	95	black walnut,
						Sugar maple	85	yellow-poplar,
						White ash	---	white ash,
								Norway spruce[2],
								Scotch pine[2].

See footnotes at end of table.

TABLE 10.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
19 Chavies	2o	Slight	Slight	Slight	Slight	Northern red oak Yellow-poplar Pin oak Black walnut Black cherry Sugar maple	80 90 90 --- --- ---	Eastern white pine, yellow-poplar, black walnut, Scotch pine[2].
20B2, 20C2, 21B3, 21C3 Chilhowie	4c	Slight	Moderate	Moderate	Moderate	Northern red oak Virginia pine Shortleaf pine Eastern redcedar Black locust	60 60 60 --- ---	Virginia pine, eastern redcedar, shortleaf pine, black locust.
21D3 Chilhowie	4c	Moderate	Severe	Moderate	Moderate	Northern red oak Virginia pine Shortleaf pine	60 60 60	Virginia pine, eastern redcedar, shortleaf pine, black locust.
21E3 Chilhowie	4c	Severe	Severe	Moderate	Moderate	Northern red oak Virginia pine Shortleaf pine Eastern redcedar Black locust	60 60 60 --- ---	Virginia pine, eastern redcedar, shortleaf pine, black locust.
[3]22B2, [3]22C2:								
Chilhowie	4c	Slight	Moderate	Moderate	Moderate	Northern red oak Virginia pine Shortleaf pine Eastern redcedar Black locust	60 60 60 --- ---	Virginia pine, eastern redcedar, shortleaf pine, black locust.
Edom	2o	Slight	Slight	Slight	Slight	Northern red oak Yellow-poplar Black locust	80 90 ---	Eastern white pine, yellow-poplar, Norway spruce[2], black walnut, black locust.
[3]22D2:								
Chilhowie	4c	Moderate	Severe	Moderate	Moderate	Northern red oak Virginia pine Shortleaf pine Eastern redcedar Black locust	60 60 60 --- ---	Virginia pine, eastern redcedar, shortleaf pine, black locust.
Edom	2r	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar Black locust	80 90 ---	Eastern white pine, yellow-poplar, Norway spruce[2], Virginia pine, black walnut, black locust.
[3]23C3:								
Chilhowie	4c	Slight	Moderate	Moderate	Moderate	Northern red oak Virginia pine Shortleaf pine Eastern redcedar	60 60 60 ---	Virginia pine, eastern redcedar, shortleaf pine, black locust.
Edom	2o	Slight	Slight	Slight	Slight	Northern red oak Yellow-poplar Black locust	80 90 ---	Eastern white pine, yellow-poplar, Norway spruce[2], Virginia pine, black locust.

See footnotes at end of table.

TABLE 10.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
323E3:								
Chilhowie	4c	Moderate	Severe	Moderate	Moderate	Northern red oak Virginia pine Shortleaf pine Eastern redcedar	60 60 60 ---	Virginia pine, eastern redcedar, shortleaf pine, black locust.
Edom	2r	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar Black locust	80 90 ---	Eastern white pine, yellow-poplar, Norway spruce[2], Virginia pine, black locust.
24B2, 24C2: Christian	2c	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar	70 85	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Scotch pine[2].
24D2, 24E2: Christian	2c	Moderate	Moderate	Slight	Slight	Northern red oak Yellow-poplar	70 85	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Scotch pine[2].
25C2: Christian	2c	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar	70 85	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Scotch pine[2].
25D2: Christian	2c	Moderate	Moderate	Slight	Slight	Northern red oak Yellow-poplar Loblolly pine	70 85 80	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Scotch pine[2].
26: Cotaco Variant	3w	Slight	Moderate	Slight	Slight	White oak Northern red oak Black oak Eastern white pine Red maple	70 70 70 80 70	Eastern white pine, shortleaf pine.
27, 28: Craigsville	2o	Slight	Slight	Slight	Slight	Northern red oak Yellow-poplar Eastern white pine Virginia pine	80 100 85 75	Loblolly pine, eastern white pine, yellow-poplar, Scotch pine[2].
29E: Drall (north aspect)	3f	Slight	Moderate	Moderate	Slight	Northern red oak Virginia pine Eastern white pine	75 70 85	Virginia pine, pitch pine.
29E: Drall (south aspect)	4f	Slight	Moderate	Severe	Slight	Northern red oak Virginia pine Eastern white pine	65 60 75	Virginia pine, pitch pine.
29F: Drall (north aspect)	3f	Moderate	Severe	Moderate	Slight	Northern red oak Virginia pine Eastern white pine	75 70 85	Virginia pine, pitch pine.
29F: Drall (south aspect)	4f	Moderate	Severe	Severe	Slight	Northern red oak Virginia pine Eastern white pine	65 60 75	Virginia pine, pitch pine.

See footnotes at end of table.

TABLE 10.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
30B2, 30C2--------- Edom	2o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar-------	80 90	Eastern white pine, yellow-poplar, Norway spruce[2], Virginia pine, Scotch pine[2].
30D2--------------- Edom	2r	Slight	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar------- Black locust--------	80 90 ---	Eastern white pine, yellow-poplar, Norway spruce[2], Virginia pine, Scotch pine[2].
31B3, 31C3--------- Edom	2o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar------- Black locust--------	80 90 ---	Eastern white pine, yellow-poplar, Norway spruce[2], Virginia pine, black locust, Scotch pine[2].
[3]32C2:								
Edom--------------	2o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar------- Black locust--------	80 90 ---	Eastern white pine, yellow-poplar, Norway spruce[2], Virginia pine, black locust, Scotch pine[2].
Rock outcrop.								
[3]32E2:								
Edom--------------	2r	Slight	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar------- Black locust--------	80 90 ---	Eastern white pine, yellow-poplar, Norway spruce[2], black locust.
Rock outcrop.								
33E---------------- Elliber (north aspect)	1f	Slight	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar-------	85 95	Eastern white pine, Norway spruce[2], black walnut, yellow-poplar, black locust.
33E---------------- Elliber (south aspect)	2f	Slight	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar-------	75 90	Eastern white pine, Norway spruce[2], black walnut, yellow-poplar, black locust.
[3]34F:								
Elliber----------- (north aspect)	1f	Moderate	Severe	Slight	Slight	Northern red oak---- Yellow-poplar-------	85 95	Eastern white pine, Norway spruce[2], black walnut, yellow-poplar, black locust.
Jefferson--------- (north aspect)	2r	Moderate	Severe	Slight	Slight	Northern red oak---- Yellow-poplar------- Virginia pine-------	76 100 75	Black walnut, yellow-poplar, eastern white pine, Norway spruce[2].
[3]34F:								
Elliber----------- (south aspect)	2f	Moderate	Severe	Slight	Slight	Northern red oak---- Yellow-poplar------- Black locust--------	75 90 ---	Eastern white pine, Norway spruce, black walnut, yellow-poplar, black locust.

See footnotes at end of table.

TABLE 10.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Trees to plant
334F:								
Jefferson (south aspect)	3r	Moderate	Severe	Slight	Slight	Northern red oak Shortleaf pine Virginia pine	62 65 70	Eastern white pine, loblolly pine, shortleaf pine, Scotch pine[2].
35B2, 35C2, 36B2 Endcav	1o	Slight	Slight	Slight	Slight	Northern red oak Yellow-poplar Black locust	85 95 ---	Yellow-poplar, eastern white pine, black walnut, black locust, Scotch pine[2].
337C2:								
Endcav	1o	Slight	Slight	Slight	Slight	Northern red oak Yellow-poplar Black locust	85 95 ---	Yellow-poplar, eastern white pine, black walnut, black locust, Scotch pine[2].
Rock outcrop.								
340B2, 340C2:								
Frederick	2c	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar Black locust White oak	75 85 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Scotch pine[2].
Christian	2c	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar Loblolly pine Black locust White oak	70 85 80 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Scotch pine[2], black locust.
340D2, 340E2:								
Frederick	2c	Moderate	Moderate	Slight	Slight	Northern red oak Yellow-poplar Black locust White oak	75 85 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Scotch pine[2], black locust.
Christian	2c	Moderate	Moderate	Slight	Slight	Northern red oak Yellow-poplar Black locust White oak	75 85 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Scotch pine[2], black locust.
341B3, 341C3:								
Frederick	2c	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar Loblolly pine Black locust White oak	75 85 80 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Scotch pine[2], black locust.

See footnotes at end of table.

TABLE 10.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Trees to plant
341B3, 341C3:								
Christian	2c	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar Black locust White oak	75 85 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Scotch pine[2], black locust.
341D3:								
Frederick	2c	Moderate	Moderate	Slight	Slight	Northern red oak Yellow-poplar Black locust White oak	75 85 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Scotch pine[2], black locust.
Christian	2c	Moderate	Moderate	Slight	Slight	Northern red oak Yellow-poplar Black locust White oak	75 85 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Scotch pine[2], black locust.
342B2, 342C2:								
Frederick	2c	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar Black locust White oak	75 85 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Scotch pine[2], black locust.
Christian	2c	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar Black locust White oak	75 85 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Scotch pine[2], black locust.
342D2, 342E2:								
Frederick	2c	Moderate	Moderate	Slight	Slight	Northern red oak Yellow-poplar Black locust White oak	75 85 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Scotch pine[2], black locust.
Christian	2c	Moderate	Moderate	Slight	Slight	Northern red oak Yellow-poplar Black locust White oak	75 85 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Scotch pine[2], black locust.
343C:								
Frederick	2c	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar Black locust White oak	75 85 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Norway spruce[2].

See footnotes at end of table.

TABLE 10.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Trees to plant
343C:								
Christian	2c	Slight	Moderate	Slight	Slight	Northren red oak Yellow-poplar Black locust White oak	75 85 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Norway spruce[2], black locust.
343D, 343E:								
Frederick	2c	Moderate	Moderate	Slight	Slight	Northern red oak Yellow-poplar Black locust White oak	75 85 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Norway spruce[2], black locust.
Christian	2c	Moderate	Moderate	Slight	Slight	Northern red oak Yellow-poplar Black locust White oak	75 85 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Norway spruce[2], black locust.
344B2, 344C2:								
Frederick	2c	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar Black locust White oak	75 85 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Scotch pine[2], black locust.
Christian	2c	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar Black locust White oak	75 85 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Scotch pine[2], black locust.
344D2, 344E2:								
Frederick	2c	Moderate	Moderate	Slight	Slight	Northern red oak Yellow-poplar Black locust White oak	75 85 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Scotch pine[2], black locust.
Christian	2c	Moderate	Moderate	Slight	Slight	Northern red oak Yellow-poplar Black locust White oak	75 85 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Scotch pine[2], black locust.

See footnotes at end of table.

TABLE 10.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
345C2:								
Frederick	2c	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar Black locust White oak	75 85 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Scotch pine[2], black locust.
Rock outcrop.								
345E2:								
Frederick	2c	Moderate	Moderate	Slight	Slight	Northern red oak Yellow-poplar Black locust White oak	75 85 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Scotch pine[2], black locust.
Rock outcrop.								
346B, 346C:								
Frederick	2c	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar Black locust White oak	75 85 --- ---	Eastern white pine, yellow-poplar, white oak, black walnut, loblolly pine, Scotch pine[2], black locust.
Nixa	4f	Slight	Slight	Moderate	---------	Shortleaf pine White oak Eastern redcedar Black locust	60 60 40 --- ---	Shortleaf pine, loblolly pine, eastern redcedar, black locust, Virginia pine.
47C Guernsey	2o	Slight	Slight	Slight	Slight	Northern red oak Yellow-poplar Sugar maple Black walnut White ash	75 85 --- --- ---	Eastern white pine, yellow-poplar, black walnut, white ash.
48E, 349F Hartleton	3r	Slight	Moderate	Moderate	Slight	Northern red oak Chestnut oak Eastern white pine Virginia pine	70 70 75 70	Virginia pine, eastern white pine, Norway spruce[2], red pine[1].
50D, 50E Hazleton	3r	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar	70 80	Eastern white pine, Norway spruce[2], black cherry.
351D Hazleton	3x	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar	70 80	Eastern white pine, Norway spruce[2], black cherry.
351F Hazleton	3x	Moderate	Severe	Slight	Slight	Northern red oak Yellow-poplar	70 80	Eastern white pine, Norway spruce[2], black cherry.
352F:								
Hazleton (north aspect)	3x	Moderate	Severe	Slight	Slight	Northern red oak Yellow-poplar	70 80	Eastern white pine, Norway spruce[2], black cherry, Scotch pine[2].
Lehew (north aspect)	3r	Moderate	Severe	Slight	Slight	Northern red oak Virginia pine	67 60	Eastern white pine, Virginia pine, red pine[1].

See footnotes at end of table.

TABLE 10.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
[3]52F: Hazleton (south aspect)	3x	Moderate	Severe	Slight	Slight	Northern red oak Yellow-poplar	70 80	Eastern white pine, Norway spruce, black cherry, Scotch pine[2].
Lehew (south aspect)	4r	Moderate	Severe	Moderate	Slight	Northern red oak Virginia pine	58 50	Eastern white pine, Virginia pine, red pine[1].
53C Jefferson	3o	Slight	Slight	Slight	Slight	Northern red oak Yellow-poplar Shortleaf pine Virginia pine	70 100 65 70	Eastern white pine, yellow-poplar, Virginia pine, shortleaf pine, loblolly pine, Scotch pine[2].
53D Jefferson (north aspect)	2r	Slight	Moderate	Slight	Slight	Northern red oak Yellow-poplar Virginia pine	76 100 75	Black walnut, yellow-poplar, eastern white pine, Virginia pine, Scotch pine[2].
53D Jefferson (south aspect)	3r	Slight	Moderate	Slight	Slight	Northern red oak Shortleaf pine Virginia pine	62 65 70	Eastern white pine, loblolly pine, shortleaf pine, Norway spruce[2].
54C Leetonia	5f	Slight	Slight	Severe	Slight	Northern red oak Virginia pine	50 60	Virginia pine, pitch pine.
54E Leetonia	5f	Slight	Moderate	Severe	Slight	Northern red oak Virginia pine	50 60	Virginia pine, pitch pine.
55D Lehew (north aspect)	3r	Slight	Moderate	Slight	Slight	Northern red oak Virginia pine	67 70	Eastern white pine, Virginia pine, red pine[1].
55D Lehew (south aspect)	4r	Slight	Moderate	Moderate	Slight	Northern red oak Virginia pine	58 50	Eastern white pine, Virginia pine, red pine[1].
56D Lehew (north aspect)	3r	Slight	Moderate	Slight	Slight	Northern red oak Virginia pine	67 70	Eastern white pine, Virginia pine, red pine[1].
56D Lehew (south aspect)	4r	Slight	Moderate	Moderate	Slight	Northern red oak Virginia pine	58 50	Eastern white pine, Virginia pine, red pine[1].
57E Lehew (north aspect)	3r	Slight	Moderate	Slight	Slight	Northern red oak Virginia pine	67 70	Eastern white pine, Virginia pine, red pine[1].
57E Lehew (south aspect)	4r	Slight	Moderate	Moderate	Slight	Northern red oak Virginia pine	58 50	Eastern white pine, Virginia pine, red pine[1].
57F Lehew	3r	Moderate	Severe	Slight	Slight	Northern red oak Virginia pine	67 70	Eastern white pine, Virginia pine, red pine[1].
57F Lehew	4r	Moderate	Severe	Moderate	Slight	Northern red oak Virginia pine	58 50	Eastern white pine, Virginia pine, red pine[1].

See footnotes at end of table.

TABLE 10.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Trees to plant
58D, 59E: Lew	2x	Slight	Moderate	Slight	Slight	Northern red oak	80	Eastern white pine, northern red oak, yellow-poplar.
						Yellow-poplar	90	
59F: Lew	2x	Moderate	Severe	Slight	Slight	Northern red oak	80	Eastern white pine, yellow-poplar.
						Yellow-poplar	90	
60: Massanetta	2w	Slight	Moderate	Slight	Slight	Pin oak	85	Black walnut, white ash, sycamore.
						Sweetgum	95	
						Sycamore	---	
61B: MIllrock	2s	Slight	Slight	Moderate	Slight	White oak	80	Black walnut, eastern white pine, Scotch pine[2].
						Northern red oak	80	
						Yellow-poplar	95	
						Eastern white pine	95	
62B: Monongahela	3w	Slight	Moderate	Slight	Slight	Northern red oak	70	Eastern white pine, loblolly pine, yellow-poplar, black cherry.
						Yellow-poplar	85	
						Eastern white pine	75	
						Virginia pine	75	
62C: Monongahela	3w	Moderate	Moderate	Slight	Slight	Northern red oak	70	Eastern white pine, loblolly pine, yellow-poplar, black cherry.
						Yellow-poplar	85	
						Eastern white pine	75	
						Virginia pine	75	
63B: Monongahela	3w	Slight	Moderate	Slight	Slight	Northern red oak	70	Eastern white pine, loblolly pine, yellow-poplar, black cherry.
						Yellow-poplar	85	
						Eastern white pine	75	
						Virginia pine	75	
63C: Monongahela	3w	Moderate	Moderate	Slight	Slight	Northern red oak	70	Eastern white pine, loblolly pine, yellow-poplar, black cherry.
						Yellow-poplar	85	
						Eastern white pine	75	
						Virginia pine	75	
64C, 64D: Nixa	4f	Slight	Slight	Moderate	---------	Shortleaf pine	60	Shortleaf pine, loblolly pine, eastern redcedar, black locust, southern red oak.
						Southern red oak	60	
						White oak	60	
						Eastern redcedar	40	
						Black walnut	---	
						Black locust	---	
[3]65E:								
Opequon	3c	Severe	Severe	Severe	Moderate	Northern red oak	70	Virginia pine, eastern redcedar, shortleaf pine.
						Eastern redcedar	---	
Rock outcrop.								
66: Philo	1w	Slight	Moderate	Slight	Slight	Virginia pine	85	Eastern white pine, yellow-poplar, loblolly pine.
						Northern red oak	85	
						Yellow-poplar	102	
						Shortleaf pine	85	
						Sweetgum	90	
67: Purdy	1w	Slight	Severe	Severe	Severe	Pin oak	85	Loblolly pine, sycamore, sweetgum, pin oak.
						Shortleaf pine	85	
						Virginia pine	85	
						Yellow-poplar	95	
						Sweetgum	95	

See footnotes at end of table.

TABLE 10.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
368E[3]:								
Rock outcrop.								
Chilhowie	4c	Moderate	Severe	Moderate	Moderate	Northern red oak	60	Virginia pine,
						Virginia pine	60	shortleaf pine,
						Shortleaf pine	60	eastern redcedar.
						Eastern redcedar	---	
						Black locust	---	
369F[3]:								
Rock outcrop.								
Drall (north aspect)	3f	Moderate	Severe	Moderate	Slight	Northern red oak	75	Virginia pine,
						Virginia pine	70	pitch pine.
						Eastern white pine	85	
369F[3]:								
Rock outcrop.								
Drall (south aspect)	4f	Moderate	Severe	Severe	Slight	Northern red oak	65	Virginia pine,
						Virginia pine	60	pitch pine.
						Eastern white pine	75	
370C[3]:								
Rock outcrop.								
Frederick	2c	Slight	Moderate	Slight	Slight	Northern red oak	75	Eastern white pine,
						Yellow-poplar	85	yellow-poplar,
						Black locust	---	white oak,
						White oak	---	black walnut,
								loblolly pine,
								Scotch pine[2],
								black locust.
370E[3]:								
Rock outcrop.								
Frederick	2c	Moderate	Moderate	Slight	Slight	Northern red oak	75	Eastern white pine,
						Yellow-poplar	85	yellow-poplar,
						Black locust	---	white oak,
						White oak	---	black walnut,
								loblolly pine,
								Scotch pine[2],
								black locust.
72F Rushtown	3f	Moderate	Severe	Slight	Slight	Northern red oak	70	Eastern white pine,
						Virginia pine	70	Virginia pine,
						Black oak	70	Norway spruce[2].
						Chestnut oak	70	
						Eastern white pine	80	
73B2, 73C2 Sequoia	3o	Slight	Slight	Slight	Slight	Northern red oak	70	Loblolly pine,
						Shortleaf pine	65	shortleaf pine,
						Virginia pine	71	Virginia pine.
						Black locust	---	
374B2[3], 374C2[3]:								
Sequoia	3o	Slight	Slight	Slight	Slight	Northern red oak	70	Loblolly pine,
						Shortleaf pine	65	shortleaf pine,
						Virginia pine	71	Virginia pine.
						Black locust	---	
Berks	3f	Slight	Slight	Moderate	Slight	Northern red oak	70	Virginia pine,
						Black oak	70	eastern white pine,
						Virginia pine	70	tamarack,
						Black locust	---	Norway spruce[2],
								red pine[1].

See footnotes at end of table.

TABLE 10.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
[3]74D2:								
Sequoia	3o	Slight	Slight	Slight	Slight	Northern red oak	70	Loblolly pine,
						Shortleaf pine	65	shortleaf pine,
						Virginia pine	71	Virginia pine.
						Black locust	---	
Berks	3f	Slight	Moderate	Moderate	Slight	Northern red oak	70	Virginia pine,
						Black oak	70	eastern white pine,
						Virginia pine	70	tamarack,
						Black locust	---	Norway spruce[2],
								red pine[1].
75B2, 75C2 Shenval	1o	Slight	Slight	Slight	Slight	Northern red oak	90	Eastern white pine,
						Yellow-poplar	95	black walnut.
75D2 Shenval	1r	Moderate	Moderate	Slight	Slight	Northern red oak	90	Eastern white pine,
						Yellow-poplar	95	black walnut,
								Scotch pine[2].
76C Shenval	1o	Slight	Slight	Slight	Slight	Northern red oak	90	Eastern white pine,
						Yellow-poplar	95	black walnut,
								Scotch pine[2].
76D Shenval	1r	Moderate	Moderate	Slight	Slight	Northern red oak	90	Eastern white pine,
						Yellow-poplar	95	black walnut,
								Scotch pine[2].
77C Sherando	3f	Slight	Slight	Slight	Slight	Northern red oak	70	Yellow-poplar,
						Yellow-poplar	101	loblolly pine,
						Virginia pine	70	shortleaf pine,
						Shortleaf pine	68	Virginia pine.
77D Sherando (north aspect)	2f	Slight	Moderate	Moderate	Slight	Northern red oak	76	Yellow-poplar,
						Yellow-poplar	100	loblolly pine,
						Virginia pine	75	shortleaf pine,
								Virginia pine,
								Norway spruce[2].
77D Sherando (south aspect)	3f	Slight	Moderate	Severe	Slight	Northern red oak	66	Eastern white pine,
						Shortleaf pine	65	loblolly pine,
						Virginia pine	65	shortleaf pine,
								Virginia pine,
								Norway spruce[2].
78C Sherando	3f	Slight	Slight	Moderate	Slight	Northern red oak	70	Yellow-poplar,
						Yellow-poplar	101	loblolly pine,
						Virginia pine	70	shortleaf pine,
						Shortleaf pine	68	Virginia pine.
78E Sherando (north aspect)	2f	Slight	Moderate	Moderate	Slight	Northern red oak	76	Yellow-poplar,
						Yellow-poplar	100	loblolly pine,
						Virginia pine	75	shortleaf pine,
								Virginia pine,
								Norway spruce[2].
78E Sherando (south aspect)	3f	Slight	Moderate	Severe	Slight	Northern red oak	66	Eastern white pine,
						Shortleaf pine	65	loblolly pine,
						Virginia pine	65	shortleaf pine,
								Virginia pine,
								Norway spruce[2].
79B, 80B Timberville	2o	Slight	Slight	Slight	Slight	Yellow-poplar	90	Yellow-poplar,
						Northern red oak	80	black walnut,
						Shortleaf pine	80	shortleaf pine.
						Virginia pine	70	

See footnotes at end of table.

TABLE 10.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Trees to plant
81----------------- Tioga	2o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar------- Sugar maple---------	75 85 67	Eastern white pine, yellow-poplar, Norway spruce[2], black walnut.
86B, 86C2---------- Unison	1o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar------- Virginia pine-------	85 95 80	Yellow-poplar, black walnut, eastern white pine, Scotch pine[2].
86D2--------------- Unison	1r	Moderate	Moderate	Slight	Slight	Northern red oak---- Yellow-poplar------- Virginia pine-------	85 95 80	Yellow-poplar, black walnut, eastern white pine, Norway spruce[2].
87B, 87C----------- Unison	1o	Slight	Slight	Slight	Slight	Northern red oak---- Yellow-poplar------- Virginia pine-------	85 95 80	Yellow-poplar, black walnut, eastern white pine, Scotch pine[2].
87E---------------- Unison	1r	Moderate	Severe	Slight	Slight	Northern red oak---- Yellow-poplar------- Virginia pine-------	85 95 80	Yellow-poplar, black walnut, eastern white pine.
89D3--------------- Weikert (north aspect)	4d	Slight	Moderate	Severe	Moderate	Northern red oak---- Virginia pine-------	64 60	Shortleaf pine, Virginia pine.
89D3--------------- Weikert (south aspect)	5d	Slight	Moderate	Severe	Moderate	Northern red oak---- Virginia pine-------	55 52	Virginia pine, shortleaf pine.
89E3--------------- Weikert (north aspect)	4d	Slight	Moderate	Severe	Moderate	Northern red oak---- Virginia pine-------	64 60	Shortleaf pine, Virginia pine.
89E3--------------- Weikert (south aspect)	5d	Slight	Moderate	Severe	Moderate	Northern red oak---- Virginia pine-------	55 52	Virginia pine, shortleaf pine.
89F3--------------- Weikert (north aspect)	4d	Moderate	Severe	Severe	Moderate	Northern red oak---- Virginia pine-------	64 60	Shortleaf pine, Virginia pine.
89F3--------------- Weikert (south aspect)	5d	Moderate	Severe	Severe	Moderate	Northern red oak---- Virginia pine-------	55 52	Virginia pine, shortleaf pine.
[3]90D2:								
Weikert----------- (north aspect)	4d	Slight	Moderate	Severe	Moderate	Northern red oak---- Virginia pine-------	64 60	Shortleaf pine, Virginia pine.
Berks------------- (north aspect)	3f	Slight	Moderate	Moderate	Slight	Northern red oak---- Black oak----------- Virginia pine-------	70 70 70	Virginia pine, eastern white pine, tamarack, Norway spruce[2], red pine[1].

See footnotes at end of table.

TABLE 10.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
[3]90D2:								
Weikert (south aspect)	5d	Slight	Moderate	Severe	Moderate	Northern red oak Virginia pine	55 52	Virginia pine, shortleaf pine.
Berks (south aspect)	4f	Slight	Moderate	Moderate	Slight	Northern red oak Black oak Virginia pine	60 60 60	Virginia pine, tamarack, Norway spruce[2], red pine[1].
[3]90E3:								
Weikert (north aspect)	4d	Slight	Moderate	Severe	Moderate	Northern red oak Virginia pine	64 60	Shortleaf pine, Virginia pine.
Berks (north aspect)	3f	Slight	Moderate	Moderate	Slight	Northern red oak Black oak Virginia pine	70 70 70	Virginia pine, tamarack, Norway spruce[2], red pine[1].
[3]90E3:								
Weikert (south aspect)	5d	Slight	Moderate	Severe	Moderate	Northern red oak Virginia pine	55 52	Virginia pine, shortleaf pine.
Berks (south aspect)	4f	Slight	Moderate	Moderate	Slight	Northern red oak Black oak Virginia pine	60 60 60	Virginia pine, tamarack, Norway spruce[2], red pine[1].
91B, 91C2, 92B, 92C2 Wheeling	2o	Slight	Slight	Slight	Slight	Northern red oak Yellow-poplar	80 90	Eastern white pine, yellow-poplar, black walnut, Scotch pine[2].

[1]Species in this county require planting at an elevation of more than 1,800 feet.
[2]Suitable only for the production of Christmas trees.
[3]See the description of the map unit for the composition and characteristics of the entire unit.

TABLE 11.--RECREATIONAL DEVELOPMENT

[Some of the terms used in this table to describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry means the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1B Allegheny	Slight	Slight	Moderate: slope.	Slight	Slight.
[1]2B Allegheny	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Severe: small stones.
[1]3B:					
Allegheny	Slight	Slight	Moderate: slope.	Slight	Slight.
Cotaco	Moderate: wetness.	Slight	Moderate: slope, wetness.	Slight	Slight.
[1]3C:					
Allegheny	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Cotaco	Moderate: slope, wetness.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
[1]4B:					
Allegheny	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Severe: small stones.
Cotaco	Moderate: wetness, small stones.	Moderate: small stones, wetness.	Severe: small stones.	Moderate: small stones.	Severe: small stones.
[1]4C:					
Allegheny	Moderate: small stones, slope.	Moderate: small stones, slope.	Severe: slope, small stones.	Moderate: small stones.	Severe: small stones.
Cotaco	Moderate: wetness, small stones, slope.	Moderate: small stones, slope, wetness.	Severe: small stones, slope.	Moderate: small stones.	Severe: small stones.
[1]5. Aqualfs					
[1]6. Aquents					
7 Atkins	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
8D Berks	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.	Severe: slope.
8E, 8F Berks	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
[1]9B2:					
Berks	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: depth to rock, small stones.
Weikert	Moderate: small stones.	Moderate: small stones.	Severe: depth to rock.	Moderate: small stones.	Moderate: small stones.
[1]9C2:					
Berks	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: small stones, slope.	Moderate: small stones.	Moderate: slope, depth to rock, small stones.
Weikert	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, depth to rock.	Moderate: small stones.	Moderate: slope, small stones.
10B2 Bookwood	Slight	Slight	Moderate: small stones.	Slight	Slight.
10C2 Bookwood	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
10D2 Bookwood	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
10E2 Bookwood	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
11A Buchanan	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Slight.
11B Buchanan	Moderate: wetness.	Slight	Moderate: slope, wetness.	Slight	Slight.
12B Buchanan	Moderate: small stones, wetness.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.
[1]13C:					
Buchanan	Moderate: wetness, slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Monongahela	Moderate: wetness, slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
14 Buckton	Severe: floods.	Moderate: floods.	Moderate: slope, floods.	Slight	Moderate: floods.
15B Burketown	Moderate: percs slowly.	Slight	Moderate: percs slowly, slope.	Slight	Slight.
15C Burketown	Moderate: percs slowly, slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
16E, 16F Cataska	Severe: slope.	Severe: slope.	Severe: slope, depth to rock, small stones.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
17E: Cataska	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: depth to rock.
18: Chagrin	Severe: floods.	Moderate: floods.	Moderate: floods.	Slight	Moderate: floods.
19: Chavies	Slight	Slight	Moderate: slope.	Slight	Slight.
20B2: Chilhowie	Moderate: percs slowly, too clayey.	Moderate: too clayey.	Moderate: slope, too clayey.	Moderate: too clayey.	Moderate: depth to rock.
20C2: Chilhowie	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.	Moderate: slope, depth to rock.
21B3: Chilhowie	Moderate: percs slowly, too clayey.	Moderate: too clayey.	Moderate: slope, too clayey.	Moderate: too clayey.	Moderate: depth to rock.
21C3: Chilhowie	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.	Moderate: slope, depth to rock.
21D3: Chilhowie	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, too clayey.	Severe: slope.
21E3: Chilhowie	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
[1]22B2:					
Chilhowie	Moderate: percs slowly, too clayey.	Moderate: too clayey.	Moderate: slope, too clayey.	Moderate: too clayey.	Moderate: depth to rock.
Edom	Moderate: too clayey.	Moderate: too clayey.	Moderate: slope, too clayey.	Moderate: too clayey.	Moderate: too clayey.
[1]22C2:					
Chilhowie	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.	Moderate: slope, depth to rock.
Edom	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.	Moderate: slope, too clayey.
[1]22D2:					
Chilhowie	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, too clayey.	Severe: slope.
Edom	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, too clayey.	Severe: slope.
[1]23C3:					
Chilhowie	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.	Moderate: slope, depth to rock.

See footnote at end of table.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
[1]23C3:					
Edom	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.	Moderate: slope, too clayey.
[1]23E3:					
Chilhowie	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Edom	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
24B2 Christian	Slight	Slight	Moderate: slope.	Slight	Slight.
24C2 Christian	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
24D2 Christian	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
24E2 Christian	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
25C2 Christian	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope.	Moderate: small stones.	Moderate: slope, small stones.
25D2 Christian	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, small stones.	Severe: slope.
26 Cotaco Variant	Moderate: percs slowly.	Slight	Moderate: percs slowly.	Slight	Slight.
27 Craigsville	Slight	Slight	Moderate: small stones.	Slight	Severe: floods.
28 Craigsville	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Severe: floods, small stones.
29E, 29F Drall	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
30B2 Edom	Slight	Slight	Moderate: slope.	Slight	Moderate: too clayey.
30C2 Edom	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, too clayey.
30D2 Edom	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
31B3 Edom	Moderate: too clayey.	Moderate: too clayey.	Moderate: slope, too clayey.	Moderate: too clayey.	Moderate: too clayey.
31C3 Edom	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.	Moderate: slope, too clayey.
[1]32C2:					
Edom	Moderate: too clayey.	Moderate: too clayey.	Severe: slope.	Moderate: too clayey.	Moderate: too clayey.

See footnote at end of table.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
[1]32C2: Rock outcrop.					
[1]32E2: Edom	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
33E Elliber	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.
[1]34F: Elliber	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.
Jefferson	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
35B2 Endcav	Moderate: percs slowly.	Slight	Moderate: slope, percs slowly.	Slight	Slight.
35C2 Endcav	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
36B2 Endcav	Moderate: percs slowly.	Slight	Moderate: slope, percs slowly.	Slight	Slight.
[1]37C2: Endcav	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Rock outcrop.					
38B Ernest	Moderate: percs slowly, wetness.	Slight	Moderate: slope, percs slowly, wetness.	Slight	Slight.
38C Ernest	Moderate: slope, percs slowly, wetness.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
[1]39. Fluvaquents					
[1]40B2: Frederick	Slight	Slight	Moderate: slope.	Slight	Slight.
Christian	Slight	Slight	Moderate: slope.	Slight	Slight.
[1]40C2: Frederick	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.

See footnote at end of table.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
[1]40C2:					
Christian	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
[1]40D2:					
Frederick	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Christian	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
[1]40E2:					
Frederick	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Christian	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
[1]41B3:					
Frederick	Moderate: too clayey.	Moderate: too clayey.	Moderate: slope, too clayey.	Moderate: too clayey.	Moderate: too clayey.
Christian	Moderate: too clayey.	Moderate: too clayey.	Moderate: slope, too clayey.	Moderate: too clayey.	Moderate: too clayey.
[1]41C3:					
Frederick	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.	Moderate: slope, too clayey.
Christian	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.	Moderate: slope, too clayey.
[1]41D3:					
Frederick	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, too clayey.	Severe: slope.
Christian	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, too clayey.	Severe: slope.
[1]42B2:					
Frederick	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.
Christian	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.
[1]42C2:					
Frederick	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: small stones.	Moderate: slope, small stones.
Christian	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: small stones.	Moderate: slope, small stones.
[1]42D2:					
Frederick	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, small stones.	Severe: slope.
Christian	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, small stones.	Severe: slope.

See footnote at end of table.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
[1]42E2:					
Frederick	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Christian	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
[1]43C:					
Frederick	Severe: small stones.	Severe: small stones.	Severe: slope.	Severe: small stones.	Severe: small stones.
Christian	Severe: small stones.	Severe: small stones.	Severe: slope.	Severe: small stones.	Severe: small stones.
[1]43D, [1]43E:					
Frederick	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.
Christian	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: slope, small stones.
[1]44B2:					
Frederick	Slight	Slight	Moderate: slope.	Slight	Slight.
Christian	Slight	Slight	Moderate: slope.	Slight	Slight.
[1]44C2:					
Frederick	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Christian	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
[1]44D2:					
Frederick	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Christian	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
[1]44E2:					
Frederick	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Christian	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
[1]45C2:					
Frederick	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Rock outcrop.					
[1]45E2:					
Frederick	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
[1]46B:					
Frederick	Slight	Slight	Moderate: slope.	Slight	Slight.

See footnote at end of table.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
[1]46B:					
Nixa	Severe: percs slowly.	Moderate: small stones.	Severe: percs slowly, small stones.	Moderate: small stones.	Moderate: small stones.
[1]46C:					
Frederick	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope.	Moderate: small stones.	Moderate: slope, small stones.
Nixa	Severe: percs slowly.	Moderate: slope, small stones.	Severe: slope, percs slowly, small stones.	Moderate: small stones.	Moderate: slope, small stones.
47C Guernsey	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: slope, wetness, percs slowly.	Slight	Moderate: wetness, small stones.
48E, [1]49F Hartleton	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
50D Hazleton	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, large stones.	Severe: slope.
50E Hazleton	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
[1]51D Hazleton	Severe: slope, large stones.	Severe: slope.	Severe: slope, small stones, large stones.	Severe: large stones.	Severe: slope.
[1]51F Hazleton	Severe: slope, large stones.	Severe: slope.	Severe: slope, small stones, large stones.	Severe: slope, large stones.	Severe: slope.
[1]52F:					
Hazleton	Severe: slope, large stones.	Severe: slope.	Severe: slope, small stones, large stones.	Severe: slope, large stones.	Severe: slope.
Lehew	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
53C Jefferson	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Moderate: slope, small stones.
53D Jefferson	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.	Severe: slope.
54C Leetonia	Moderate: large stones.	Moderate: small stones.	Severe: slope.	Moderate: small stones.	Severe: too sandy.
54E Leetonia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
55D, 56D: Lehew	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: small stones.	Severe: slope.
57E, 57F: Lehew	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
58D: Lew	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: slope, small stones.
59E, 59F: Lew	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.
60: Massanetta	Severe: floods.	Moderate: wetness, floods.	Moderate: floods, wetness.	Slight	Moderate: floods.
61B: Millrock	Severe: floods.	Moderate: floods, too sandy.	Moderate: floods, too sandy.	Moderate: too sandy.	Severe: floods.
62B: Monongahela	Moderate: wetness.	Slight	Moderate: slope, wetness.	Slight	Slight.
62C: Monongahela	Moderate: wetness, slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
63B: Monongahela	Moderate: small stones, wetness.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.
63C: Monongahela	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Moderate: slope, small stones.
64C: Nixa	Severe: percs slowly.	Moderate: slope, small stones.	Severe: slope, percs slowly, small stones.	Moderate: small stones.	Severe: small stones.
64D: Nixa	Severe: percs slowly, slope.	Severe: slope.	Severe: percs slowly, slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.
[1]65E:					
Opequon	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
66: Philo	Severe: floods.	Moderate: floods.	Moderate: floods.	Slight	Moderate: floods.
[1]66X. Pits and dumps					
67: Purdy	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
[1]68E: Rock outcrop.					

See footnote at end of table.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
[1]68E:					
Chilhowie	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
[1]69F:					
Rock outcrop.					
Drall	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
[1]70C:					
Rock outcrop.					
Frederick	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
[1]70E:					
Rock outcrop.					
Frederick	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
[1]71.					
Rubble land					
72F Rushtown	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
73B2 Sequoia	Moderate: percs slowly.	Slight	Moderate: slope, percs slowly.	Slight	Moderate: depth to rock.
73C2 Sequoia	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, depth to rock.
[1]74B2:					
Sequoia	Moderate: percs slowly.	Slight	Moderate: slope, percs slowly.	Slight	Moderate: depth to rock.
Berks	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: depth to rock, small stones.
[1]74C2:					
Sequoia	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, depth to rock.
Berks	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: small stones, slope.	Moderate: small stones.	Moderate: slope, depth to rock, small stones.
[1]74D2:					
Sequoia.					
Berks	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Moderate: slope, small stones.	Severe: slope.
75B2 Shenval	Slight	Slight	Moderate: slope.	Slight	Slight.

See footnote at end of table.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
75C2 Shenval	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
75D2 Shenval	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
76C Shenval	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Severe: small stones.
76D Shenval	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.
77C Sherando	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
77D Sherando	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
78C Sherando	Moderate: slope.	Moderate: slope.	Severe: slope, small stones.	Moderate: small stones.	Severe: small stones.
78E Sherando	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
79B Timberville	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods.	Severe: floods.
80B Timberville	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods, small stones.	Severe: floods.
81 Tioga	Severe: floods.	Moderate: floods.	Moderate: floods.	Slight	Slight.
[1]82. Udifluvents					
[1]83, [1]84, [1]85. Udorthents					
86B Unison	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
86C2 Unison	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
86D2 Unison	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
87B Unison	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Severe: small stones.
87C Unison	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Severe: small stones.
87E Unison	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope, small stones.

See footnote at end of table.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
[1]88. Urban land					
89D3: Weikert	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.	Moderate: slope, small stones.	Severe: slope.
89E3, 89F3: Weikert	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.
[1]90D2:					
Weikert	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.	Moderate: slope, small stones.	Severe: slope.
Berks	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Moderate: slope, small stones.	Severe: slope.
[1]90E3:					
Weikert	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.
Berks	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Severe: slope.	Severe: slope.
91B: Wheeling	Moderate: floods.	Moderate: floods.	Moderate: slope.	Slight	Slight.
91C2: Wheeling	Moderate: slope, floods.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
92B: Wheeling	Moderate: floods, small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.
92C2: Wheeling	Moderate: slope, floods, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Moderate: slope, small stones.

[1]See the map unit description for the composition and behavior of the entire unit.

TABLE 12.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
1B Allegheny	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
[1]2B Allegheny	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
[1]3B:										
Allegheny	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Cotaco	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
[1]3C:										
Allegheny	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Cotaco	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
[1]4B:										
Allegheny	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Cotaco	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
[1]4C:										
Allegheny	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Cotaco	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
[1]5. Aqualfs										
[1]6. Aquents										
7 Atkins	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
8D Berks	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
8E, 8F Berks	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
[1]9B2:										
Berks	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
Weikert	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
[1]9C2:										
Berks	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
Weikert	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.

See footnote at end of table.

TABLE 12.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
10B2----------------Bookwood	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
10C2----------------Bookwood	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
10D2----------------Bookwood	Poor	Fair	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
10E2----------------Bookwood	Very poor.	Poor	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
11A----------------Buchanan	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
11B, 12B-----------Buchanan	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
[1]13C:										
Buchanan-----------	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
Monongahela--------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
14-----------------Buckton	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
15B----------------Burketown	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
15C----------------Burketown	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
16E, 16F, 17E------Cataska	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
18-----------------Chagrin	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
19-----------------Chavies	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
20B2---------------Chilhowie	Poor	Fair	Fair	Poor	Poor	Poor	Very poor.	Fair	Poor	Very poor.
20C2---------------Chilhowie	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
21B3---------------Chilhowie	Poor	Fair	Fair	Poor	Poor	Poor	Very poor.	Fair	Poor	Very poor.
21C3, 21D3---------Chilhowie	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
21E3---------------Chilhowie	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
[1]22B2:										
Chilhowie----------	Poor	Fair	Fair	Poor	Poor	Poor	Very poor.	Fair	Poor	Very poor.
Edom---------------	Fair	Good	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

TABLE 12.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
[1]22C2:										
Chilhowie	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
Edom	Fair	Good	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
[1]22D2:										
Chilhowie	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
Edom	Poor	Fair	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
[1]23C3:										
Chilhowie	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
Edom	Fair	Good	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
[1]23E3:										
Chilhowie	Very poor.	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Edom	Very poor.	Fair	Fair	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
24B2 Christian	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
24C2 Christian	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
24D2 Christian	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
24E2 Christian	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
25C2 Christian	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
25D2 Christian	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
26 Cotaco Variant	Fair	Good	Fair	Good	Good	Fair	Poor	Fair	Good	Poor.
27, 28 Craigsville	Poor	Fair	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
29E, 29F Drall	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
30B2 Edom	Fair	Good	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
30C2 Edom	Fair	Good	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
30D2 Edom	Poor	Fair	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
31B3 Edom	Fair	Good	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

TABLE 12.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
31C3 Edom	Fair	Good	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
[1]32C2:										
Edom	Fair	Good	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
Rock outcrop.										
[1]32E2:										
Edom	Very poor.	Fair	Fair	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Rock outcrop.										
33E Elliber	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
[1]34F:										
Elliber	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Jefferson	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
35B2 Endcav	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
35C2 Endcav	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
36B2 Endcav	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
[1]37C2:										
Endcav	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Rock outcrop.										
38B Ernest	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
38C Ernest	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
[1]39. Fluvaquents										
[1]40B2:										
Frederick	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Christian	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
[1]40C2:										
Frederick	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Christian	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
[1]40D2:										
Frederick	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

TABLE 12.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
[1]40D2:										
Christian	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
[1]40E2:										
Frederick	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Christian	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
[1]41B3:										
Frederick	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Christian	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
[1]41C3:										
Frederick	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Christian	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
[1]41D3:										
Frederick	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Christian	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
[1]42B2:										
Frederick	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Christian	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
[1]42C2:										
Frederick	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Christian	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
[1]42D2:										
Frederick	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Christian	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
[1]42E2:										
Frederick	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Christian	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
[1]43C:										
Frederick	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Christian	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 12.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
[1]43D, [1]43E:										
Frederick	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Christian	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
[1]44B2:										
Frederick	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Christian	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
[1]44C2:										
Frederick	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Christian	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
[1]44D2:										
Frederick	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Christian	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
[1]44E2:										
Frederick	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Christian	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
[1]45C2:										
Frederick	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Rock outcrop.										
[1]45E2:										
Frederick	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Rock outcrop.										
[1]46B:										
Frederick	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Nixa	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
[1]46C:										
Frederick	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Nixa	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
47C Guernsey	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
48E Hartleton	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

TABLE 12.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Conif- erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
[1]49F---------------- Hartleton	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
50D, 50E----------- Hazleton	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
[1]51D, [1]51F--------- Hazleton	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
[1]52F:										
Hazleton----------	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Lehew-------------	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
53C---------------- Jefferson	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
53D---------------- Jefferson	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
54C, 54E----------- Leetonia	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
55D, 56D----------- Lehew	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
57E---------------- Lehew	Very poor.	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
57F---------------- Lehew	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
58D, 59E, 59F------ Lew	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
60----------------- Massanetta	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
61B---------------- Millrock	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
62B---------------- Monongahela	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
62C---------------- Monongahela	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
63B---------------- Monongahela	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
63C---------------- Monongahela	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
64C---------------- Nixa	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
64D---------------- Nixa	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
[1]65E:										
Opequon------------	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Rock outcrop.										

See footnote at end of table.

TABLE 12.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
66: Philo	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
[1]66X. Pits and dumps										
67: Purdy	Poor	Fair	Fair	Fair	---	Good	Good	Fair	Fair	Good.
[1]68E: Rock outcrop.										
Chilhowie	Very poor.	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
[1]69F: Rock outcrop.										
Drall	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
[1]70C: Rock outcrop.										
Frederick	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
[1]70E: Rock outcrop.										
Frederick	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
[1]71. Rubble land										
72F: Rushtown	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
73B2, 73C2: Sequoia	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
[1]74B2: Sequoia	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Berks	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
[1]74C2: Sequoia	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Berks	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
[1]74D2: Sequoia	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Berks	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
75B2: Shenval	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 12.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
75C2 Shenval	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
75D2 Shenval	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
76C Shenval	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
76D Shenval	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
77C Sherando	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
77D Sherando	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
78C Sherando	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
78E Sherando	Very poor.	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
79B, 80B Timberville	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
81 Tioga	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
[1]82. Udifluvents										
[1]83, [1]84, [1]85. Udorthents										
86B Unison	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
86C2 Unison	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
86D2 Unison	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
87B Unison	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
87C Unison	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
87E Unison	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
[1]88. Urban land										
89D3, 89E3, 89F3 Weikert	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
[1]90D2: Weikert	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Berks	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.

See footnote at end of table.

TABLE 12.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
[1]90E3:										
Weikert	Very poor.	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.
Berks	Very poor.	Fair	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
91B Wheeling	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
91C2 Wheeling	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
92B Wheeling	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
92C2 Wheeling	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

[1]See the map unit description for the composition and behavior of the entire unit.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS

[The symbol < means less than; > means greater than. Absence of an entry means data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
1B----------------- Allegheny	0-6	Fine sandy loam	SM, ML, CL-ML	A-4	0	90-100	85-100	60-85	35-55	<20	[1]NP-5
	6-34	Clay loam, loam, sandy clay loam.	ML, CL, SM, SC	A-4, A-6	0	90-100	85-100	65-95	35-80	<35	NP-15
	34-60	Clay loam, sandy loam, gravelly sandy loam.	SM, SC, ML, CL	A-4, A-6, A-2, A-1	0-5	65-100	55-100	35-95	20-75	<35	NP-15
[2]2B---------------- Allegheny	0-6	Cobbly fine sandy loam.	ML, SM, CL, SC	A-2, A-4	15-30	80-95	70-85	50-80	25-60	<30	NP-10
	6-34	Clay loam, silty clay loam, gravelly sandy clay loam.	SM, CL, ML, SC	A-2, A-4, A-6	0-15	70-95	60-90	50-90	20-85	16-35	2-15
	34-60	Clay loam, very gravelly sandy loam, loam.	ML, CL, SM, SC	A-4, A-6, A-2, A-1	0-15	40-95	30-95	25-95	20-75	10-35	NP-15
[2]3B, [2]3C: Allegheny---------	0-6	Fine sandy loam	SM, ML, CL-ML	A-4	0	90-100	85-100	60-85	35-55	<20	NP-5
	6-34	Clay loam, loam, sandy clay loam.	ML, CL, SM, SC	A-4, A-6	0	90-100	85-100	65-95	35-80	<35	NP-15
	34-60	Clay loam, sandy loam, gravelly sandy loam.	SM, SC, ML, CL	A-4, A-6, A-2, A-1	0-5	65-100	55-100	35-95	20-75	<35	NP-15
Cotaco------------	0-15	Fine sandy loam	ML, CL-ML, SM, SM-SC	A-4	0-5	80-100	75-95	55-85	35-80	<30	NP-7
	15-60	Gravelly sandy clay loam, clay loam, loam.	SC, SM, GC, CL	A-2, A-4, A-6, A-1-B	0-10	60-100	50-95	40-70	20-70	<35	NP-15
[2]4B, [2]4C: Allegheny---------	0-6	Cobbly fine sandy loam.	ML, SM, CL, SC	A-2, A-4	15-30	80-95	70-85	50-80	25-60	<30	NP-10
	6-34	Clay loam, silty clay loam, gravelly sandy clay loam.	SM, CL, ML, SC	A-2, A-4, A-6	0-15	70-95	60-90	50-90	20-85	16-35	2-15
	34-60	Clay loam, very gravelly sandy loam, loam.	ML, CL, SM, SC	A-4, A-6, A-2, A-1	0-15	40-95	30-95	25-95	20-75	10-35	NP-15
Cotaco------------	0-15	Cobbly fine sandy loam.	CL, SM, ML, SC	A-4	25-40	80-95	70-90	60-90	45-80	<30	NP-10
	15-60	Gravelly sandy clay loam, cobbly loam, clay loam.	GM, SC, ML, CL	A-4, A-6	0-40	65-95	50-95	45-90	36-75	12-35	NP-15
[2]5. Aqualfs											
[2]6. Aquents											

See footnotes at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
7----------------- Atkins	0-9	Fine sandy loam	ML, CL, SM	A-4, A-6	0-5	90-100	90-100	60-95	35-75	20-50	1-25
	9-33	Silty clay loam, loam, sandy loam.	SM, SC, ML, CL	A-2, A-4, A-6	0-5	85-100	80-100	50-100	25-85	20-50	1-25
	33-67	Stratified silty clay loam to sandy loam.	SM, SC, GM, ML	A-2, A-4, A-6, A-1	0-20	45-100	35-100	25-95	15-85	20-45	1-15
8D, 8E, 8F--------- Berks	0-10	Channery silt loam.	GM, ML, GC, SC	A-2, A-4	0-30	50-80	45-70	40-60	30-55	25-36	5-10
	10-19	Channery loam, very channery loam, channery silt loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	19-30	Channery loam, very channery loam, channery silt loam.	GM, GC, SM, SC	A-1, A-2-4	0-40	35-65	25-55	20-40	15-35	24-38	2-10
	30	Weathered bedrock.	---	---	---	---	---	---	---	---	---
[1]9B2, [1]9C2: Berks-------------	0-10	Shaly silt loam	GM, ML, GC, SC	A-2, A-4	0-30	50-80	45-70	40-60	30-55	25-36	5-10
	10-19	Shaly loam, very shaly loam, shaly silt loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	19-30	Shaly loam, very shaly loam, shaly silt loam.	GM, GC, SM, SC	A-1, A-2-4	0-40	35-65	25-55	20-40	15-35	24-38	2-10
	30	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Weikert-----------	0-5	Shaly silt loam	GM, ML	A-1, A-2, A-4	0-10	35-70	35-70	25-65	20-55	30-40	4-10
	5-13	Shaly loam, very shaly silt loam.	GM	A-1, A-2	0-20	15-60	10-45	5-35	5-35	28-36	3-9
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
10B2, 10C2, 10D2, 10E2-------------- Bookwood	0-6	Silt loam-------	ML, CL	A-4, A-6	0-5	90-100	75-100	70-100	55-95	20-30	7-15
	6-30	Gravelly clay loam, gravelly loam.	CL, ML, GM	A-6 A-4	0-10	40-100	60-95	45-80	40-75	25-45	10-30
	30-36	Very gravelly silty clay loam.	GM, GC, CL, MH	A-6, A-7	0-15	40-95	30-60	40-75	35-70	35-55	20-35
	36-41	Weathered bedrock.	---	---	---	---	---	---	---	---	---
	41	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
11A, 11B----------- Buchanan	0-11	Fine sandy loam	ML, SM, CL-ML, SM-SC	A-4	0-5	90-100	85-100	75-100	45-90	20-35	1-10
	11-20	Loam, silt loam, clay loam.	ML, CL	A-4, A-6	0-10	90-100	90-100	80-100	70-90	20-40	5-15
	20-44	Loam, silt loam, sandy clay loam.	ML, CL, SM, SC	A-4, A-6	0-10	80-100	75-100	70-95	45-95	20-40	1-15
	44-60	Stratified gravelly sandy loam to clay loam.	ML, CL, SM, GM	A-4, A-1, A-6	5-20	45-100	35-100	25-95	15-95	20-40	1-15

See footnotes at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
12B----------------- Buchanan	0-11	Cobbly fine sandy loam.	ML, SM, CL-ML, SM-SC	A-4	0-15	80-90	75-85	70-80	45-75	20-35	1-10
	11-20	Loam, silt loam, clay loam.	ML, CL	A-4, A-6	0-10	90-100	90-100	80-100	70-90	20-40	5-15
	20-44	Loam, silt loam, sandy clay loam.	ML, CL, SM, SC	A-4, A-6	0-10	80-100	75-100	70-95	45-95	20-40	1-15
	44-60	Stratified gravelly sandy loam to clay loam.	ML, CL, SM, GM	A-4, A-1, A-6	5-20	45-100	35-100	25-95	15-95	20-40	1-15
[2]13C:											
Buchanan----------	0-11	Loam-------------	ML, SM, CL-ML, SM-SC	A-4	0-5	90-100	85-100	75-100	45-90	20-35	1-10
	11-20	Loam, silt loam, clay loam.	ML, CL	A-4, A-6	0-10	90-100	90-100	80-100	70-90	20-40	5-15
	20-44	Loam, silt loam, sandy clay loam.	ML, CL, SM, SC	A-4, A-6	0-10	80-100	75-100	70-95	45-95	20-40	1-15
	44-60	Stratified gravelly sandy loam to clay loam.	ML, CL, SM, GM	A-4, A-1, A-6	5-20	45-100	35-100	25-95	15-95	20-40	1-15
Monongahela--------	0-9	Loam-------------	ML, SM, CL-ML, SM-SC	A-4	0-5	90-100	85-100	75-100	45-90	20-35	1-10
	9-28	Loam, silt loam, clay loam.	ML, CL	A-4, A-6	0-10	90-100	90-100	80-100	70-90	20-40	5-15
	28-53	Loam, silt loam, sandy clay loam.	ML, CL, SM, SC	A-4, A-6	0-10	80-100	75-100	70-95	45-95	20-40	1-15
	53-62	Stratified gravelly sandy loam, to clay loam.	ML, CL, SM, SC	A-4, A-6	5-20	75-100	60-100	60-95	40-95	20-40	1-15
14------------------ Buckton	0-7	Silt loam--------	SM, SC, ML, CL	A-4	0-5	90-100	90-100	70-100	40-95	15-40	NP-10
	7-54	Silt loam, loam, fine sandy loam.	CL, SC	A-4, A-6, A-7	0-5	90-100	90-100	70-95	40-90	20-45	7-20
	54-90	Silt loam, fine sandy loam.	SM, ML	A-2, A-4	0-5	80-100	70-100	50-95	30-75	12-26	NP-8
15B, 15C----------- Burketown	0-15	Fine sandy loam	ML, SM	A-2, A-4	0	95-100	85-100	55-95	30-65	<25	NP-8
	15-34	Fine sandy loam, loam.	ML, SM, SC	A-2, A-4	0	95-100	85-100	55-95	30-75	<30	NP-10
	34-48	Fine sandy loam	ML, SM	A-2, A-4	0	95-100	85-100	60-85	30-55	<25	NP-8
	48-64	Clay loam, sandy clay loam.	SM, ML, CL, CH	A-2, A-4, A-6, A-7	0	95-100	85-100	60-95	30-85	<65	NP-35
16E, 16F----------- Cataska	0-7	Slaty silt loam	CL-ML, ML, GM, GM-GC	A-4	5-15	55-80	50-75	45-70	40-60	<30	NP-6
	7-17	Very slaty loam, channery silt loam, very channery silt loam.	GM-GC, GM	A-2, A-1	10-25	15-50	10-45	10-40	10-35	<30	NP-7
	17-24	Weathered bedrock.	---	---	---	---	---	---	---	---	---
	24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
17E----------------- Cataska	0-7	Very stony silt loam.	CL-ML, ML, GM, GM-GC	A-4	10-30	45-80	45-75	40-70	40-60	<28	NP-6
	7-17	Very slaty loam, channery silt loam, very channery silt loam.	GM-GC, GM	A-2, A-1	10-25	15-50	10-45	10-40	10-35	<28	NP-7
	17-24	Weathered bedrock.	---	---	---	---	---	---	---	---	---
	24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
18----------------- Chagrin	0-11	Loam------------	ML, CL-ML	A-4	0	95-100	90-100	80-100	70-90	25-35	NP-10
	11-48	Loam, fine sandy loam.	ML, CL-ML, SM	A-4	0	90-100	85-100	75-90	45-85	20-40	NP-10
	48-72	Stratified fine sandy loam to gravelly loamy sand.	ML, SM, GW-GM	A-4, A-1, A-2	0	45-100	35-100	25-85	10-55	<35	NP-10
19----------------- Chavies	0-14	Fine sandy loam	SM, ML	A-4, A-2	0-30	75-100	55-100	40-95	25-75	<25	NP-5
	14-34	Fine sandy loam, gravelly fine sandy loam, silt loam.	SM, ML	A-4, A-2	0-5	70-100	60-100	45-100	25-85	<35	NP-8
	34-62	Fine sandy loam, gravelly fine sandy loam, very cobbly loamy sand.	SM, ML	A-4, A-1, A-2	0-45	70-100	60-95	40-85	20-75	<25	NP-5
20B2, 20C2, 21B3, 21C3, 21D3, 21E3-- Chilhowie	0-7	Silty clay loam	MH, ML	A-7	0-10	90-100	85-100	80-100	70-95	40-65	15-30
	7-17	Clay, silty clay	CH, MH	A-7	0-10	90-100	85-100	80-100	75-95	50-65	20-35
	17-22	Very channery clay, very channery silty clay, flaggy clay.	CH, GC, MH, GM	A-7, A-2	10-30	25-80	15-65	15-65	15-60	50-65	20-35
	22	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
[2]22B2, [2]22C2, [2]22D2, [2]23C3, [2]23E3:											
Chilhowie--------	0-7	Silty clay loam	MH, ML	A-7	0-10	90-100	85-100	80-100	70-95	40-65	15-30
	7-17	Clay, silty clay	CH, MH	A-7	0-10	90-100	85-100	80-100	75-95	50-65	20-35
	17-22	Very channery clay, very channery silty clay, flaggy clay.	CH, GC, MH, GM	A-7, A-2	10-30	25-80	15-65	15-65	15-60	50-65	20-35
	22	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
[2]22B2, [2]22C2, [2]22D2, [2]23C3, [2]23E3:											
Edom	0-8	Silty clay loam	ML, CL	A-4, A-6	0	85-100	80-100	75-95	70-90	---	---
	8-40	Silty clay, channery clay, shaly silty clay loam.	MH, CH, ML, CL	A-7, A-6	0-10	70-95	65-95	65-95	55-90	35-55	12-30
	40-70	Weathered bedrock.	---	---	---	---	---	---	---	---	---
24B2, 24C2, 24D2, 24E2 Christian	0-7	Fine sandy loam	ML, CL, SM	A-4, A-6	0-5	75-95	70-95	60-90	35-80	<35	NP-15
	7-13	Clay loam, silty clay loam, cherty loam.	CL, GC	A-6, A-7	0-5	75-100	65-100	55-95	40-90	30-45	10-25
	13-40	Clay, silty clay, cherty loam.	CH, MH, SC	A-7	0-5	75-100	65-100	55-100	40-100	50-85	25-55
	40-70	Clay, silty clay, silty clay loam.	CH, MH	A-7	0-5	90-100	80-100	75-100	60-100	50-85	25-55
25C2, 25D2 Christian	0-7	Cherty fine sandy loam.	ML, CL, SM	A-2, A-4, A-6	0-5	75-95	65-75	45-70	25-60	<35	NP-15
	7-13	Clay loam, silty clay loam, cherty loam.	CL, GC	A-6, A-7	0-5	75-100	65-100	55-95	40-90	30-45	10-25
	13-40	Clay, silty clay, cherty loam.	CH, MH, SC	A-7	0-5	75-100	65-100	55-100	40-100	50-85	25-55
	40-70	Clay, silty clay, silty clay loam.	CH, MH	A-7	0-5	90-100	80-100	75-100	60-100	50-85	25-55
26 Cotaco Variant	0-8	Silt loam	ML, CL	A-6	0	80-100	75-100	75-95	60-90	25-40	10-20
	8-61	Clay, silty clay, clay loam.	MH	A-7	0	85-100	80-100	75-95	55-90	50-70	20-30
	61-98	Clay, gravelly clay loam, very cobbly sandy clay loam.	MH, GM	A-2, A-7	0-40	55-100	45-100	40-95	30-90	50-70	20-30
27 Craigsville	0-5	Fine sandy loam	ML, SM, CL-ML, SC	A-2, A-4	0-5	80-95	75-95	45-90	30-85	<25	NP-10
	5-27	Gravelly sandy loam, cobbly loam, very gravelly sandy loam.	SM, CL, ML, SC	A-1, A-2, A-4	10-20	70-80	60-85	35-75	20-60	<25	NP-10
	27-60	Very gravelly loamy sand, very gravelly sandy loam, very cobbly sandy loam.	GC, GM, GP-GM	A-1, A-2	20-30	35-55	30-50	20-45	10-25	<25	NP-8

See footnotes at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
28------------------ Craigsville	0-5	Cobbly fine sandy loam.	SM, SC	A-2, A-4	25-40	80-95	75-85	50-70	25-45	<25	NP-10
	5-27	Gravelly sandy loam, cobbly loam, very gravelly sandy loam.	SM, CL, ML, SC	A-1, A-2, A-4	10-20	70-80	60-85	35-75	20-60	<25	NP-10
	27-60	Very gravelly loamy sand, very gravelly sandy loam, very cobbly sandy loam.	GC, GM, GP-GM	A-1, A-2	20-30	35-55	30-50	20-45	10-25	<25	NP-8
29E, 29F----------- Drall	0-10	Extremely stony sandy loam.	SM	A-1, A-2	20-40	70-85	60-80	30-60	10-30	10-15	NP
	10-31	Very channery loamy sand, very channery loamy fine sand, very channery sand.	GW, GM, SW, SM	A-1, A-2	20-50	50-80	40-75	20-55	2-20	10-15	NP
	31-58	Channery sand, very channery sand, channery loamy sand.	GW, GM, SW, SM	A-1, A-2	35-80	45-80	35-70	20-55	2-20	10-15	NP
	58	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
30B2, 30C2, 30D2--- Edom	0-8	Silt loam-------	ML, CL	A-4, A-6	0	85-100	80-100	75-95	70-90	---	---
	8-40	Silty clay, clay, silty clay loam.	MH, CH, ML, CL	A-7, A-6	0-10	90-100	85-100	80-95	75-90	35-55	12-30
	40-70	Weathered bedrock.	---	---	---	---	---	---	---	---	---
31B3, 31C3--------- Edom	0-8	Silty clay loam	ML, CL	A-4, A-6	0	85-100	80-100	75-95	70-90	---	---
	8-40	Silty clay, clay, silty clay loam.	MH, CH, ML, CL	A-7, A-6	0-10	90-100	85-100	80-95	75-90	35-55	12-30
	40-70	Weathered bedrock.	---	---	---	---	---	---	---	---	---
[2]32C2, [2]32E2:											
Edom--------------	0-8	Silty clay loam	ML, CL	A-4, A-6	0	85-100	80-100	75-95	70-90	---	---
	8-40	Silty clay, clay, silty clay loam.	MH, CH, ML, CL	A-7, A-6	0-10	90-100	85-100	80-95	75-90	35-55	12-30
	40-70	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
33E---------------- Elliber	0-11	Very cherty silt loam.	GM, GP-GM	A-2, A-1, A-4	5-15	30-60	20-40	15-40	10-40	---	---
	11-63	Cherty silt loam, very cherty clay loam.	GM, GC	A-2, A-1, A-4	20-40	40-65	20-60	20-50	15-40	20-35	NP-7

See footnotes at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
[2]34F:											
Elliber-----------	0-11	Very cherty silt loam.	GM, GP-GM	A-2, A-1, A-4	5-15	30-60	20-40	15-40	10-40	---	---
	11-63	Cherty silt loam, very cherty clay loam.	GM, GC	A-2, A-1, A-4	20-40	40-65	20-60	20-50	15-40	20-35	NP-7
Jefferson---------	0-13	Very cherty fine sandy loam.	SM, GM	A-2, A-4	5-20	55-90	45-70	35-60	20-40	<25	NP-4
	13-57	Gravelly loam, clay loam, sandy clay loam.	SM, SC, ML, CL	A-4, A-2, A-6	5-20	75-90	70-90	50-80	30-70	15-35	2-15
	57-65	Very cobbly clay loam, very gravelly fine sandy loam, gravelly sandy clay loam.	GM, GC	A-2, A-4, A-1	20-45	45-55	35-45	25-45	15-40	20-40	NP-10
35B2, 35C2, 36B2--- Endcav	0-6	Silt loam-------	CL-ML, CL	A-4, A-6	0	90-100	90-100	80-100	65-90	20-35	5-15
	6-60	Clay, silty clay	CH	A-7	0	80-100	75-100	70-100	60-95	60-85	35-55
	60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
[2]37C2:											
Endcav------------	0-6	Silt loam-------	CL-ML, CL	A-4, A-6	0	90-100	90-100	80-100	65-90	20-35	5-15
	6-60	Clay, silty clay	CH	A-7	0	80-100	75-100	70-100	60-95	60-85	35-55
	60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
38B, 38C----------- Ernest	0-11	Silt loam-------	ML, CL	A-4, A-6	0-15	75-100	70-100	70-95	60-95	25-40	2-15
	11-26	Silt loam, silty clay loam.	ML, CL	A-4, A-6, A-7	0-15	75-100	75-100	70-95	65-95	25-50	2-25
	26-42	Silty clay loam, clay loam, channery silt loam.	GM, SM, ML, CL	A-4, A-6, A-7	5-20	70-95	55-95	50-95	40-95	25-50	2-25
	42-60	Silt loam, silty clay loam, channery clay loam.	GM, SM, ML, CL	A-4, A-6, A-7	5-20	70-95	55-95	50-95	40-95	25-50	2-25
[2]39. Fluvaquents											
[2]40B2, [2]40C2, [2]40D2, [2]40E2:											
Frederick--------	0-7	Silt loam-------	ML, CL	A-4, A-6	0-5	75-95	70-95	60-90	50-80	<35	NP-15
	7-14	Clay loam, silty clay loam.	CL	A-6, A-7	0-5	85-100	75-100	70-95	50-90	30-45	10-25
	14-50	Clay, silty clay.	CH, MH	A-7	0-5	85-100	75-100	70-100	55-100	50-85	25-55
	50-70	Clay, silty clay, silty clay loam.	CH, MH	A-7	0-5	90-100	80-100	75-100	60-100	50-85	25-55

See footnotes at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
[2]40B2, [2]40C2, [2]40D2, [2]40E2:											
Christian--------	0-7	Silt loam-------	ML, CL	A-4, A-6	0-5	75-95	70-95	60-90	50-80	<35	NP-15
	7-13	Clay loam, silty clay loam, cherty loam.	CL, GC	A-6, A-7	0-5	75-100	65-100	55-95	40-90	30-45	10-25
	13-40	Clay, silty clay, cherty loam.	CH, MH, SC	A-7	0-5	75-100	65-100	55-100	40-100	50-85	25-55
	40-70	Clay, silty clay, silty clay loam.	CH, MH	A-7	0-5	90-100	80-100	75-100	60-100	50-85	25-55
[2]41B3, [2]41C3, [2]41D3:											
Frederick--------	0-7	Silty clay loam	CL	A-4, A-6	0-5	75-95	70-95	70-95	55-85	30-40	10-18
	7-14	Clay loam, silty clay loam.	CL	A-6, A-7	0-5	85-100	75-100	70-95	50-90	30-45	10-25
	14-50	Clay, silty clay.	CH, MH	A-7	0-5	85-100	75-100	70-100	55-100	50-85	25-55
	50-70	Clay, silty clay, silty clay loam.	CH, MH	A-7	0-5	90-100	80-100	75-100	60-100	50-85	25-55
Christian--------	0-7	Silty clay loam	CL	A-4, A-6	0-5	75-95	70-95	70-95	55-85	30-40	10-18
	7-13	Clay loam, silty clay loam, cherty loam.	CL, GC	A-6, A-7	0-5	75-100	65-100	55-95	40-90	30-45	10-25
	13-40	Clay, silty clay, cherty loam.	CH, MH, SC	A-7	0-5	75-100	65-100	55-100	40-100	50-85	25-55
	40-70	Clay, silty clay, silty clay loam.	CH, MH	A-7	0-5	90-100	80-100	75-100	60-100	50-85	25-55
[2]42B2, [2]42C2, [2]42D2, [2]42E2, [2]43C, [2]43D, [2]43E:											
Frederick--------	0-7	Cherty silt loam	ML, CL	A-1, A-2, A-4, A-6	0-20	40-95	30-70	30-70	20-60	<35	NP-15
	7-14	Clay loam, silty clay loam.	CL	A-6, A-7	0-5	85-100	75-100	70-95	50-90	30-45	10-25
	14-50	Clay, silty clay.	CH, MH	A-7	0-5	85-100	75-100	70-100	55-100	50-85	25-55
	50-70	Clay, silty clay, silty clay loam.	CH, MH	A-7	0-5	90-100	80-100	75-100	60-100	50-85	25-55

See footnotes at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
[2]42B2, [2]42C2, [2]42D2, [2]42E2, [2]43C, [2]43D, [2]43E:											
Christian	0-7	Cherty silt loam	ML, CL, GM	A-1, A-2, A-4, A-6	0-20	40-95	30-70	30-70	20-60	<35	NP-15
	7-13	Clay loam, silty clay loam, cherty loam.	CL, GC	A-6, A-7	0-5	75-100	65-100	55-95	40-90	30-45	10-25
	13-40	Clay, silty clay, cherty loam.	CH, MH, SC	A-7	0-5	75-100	65-100	55-100	40-100	50-85	25-55
	40-70	Clay, silty clay, silty clay loam.	CH, MH	A-7	0-5	90-100	80-100	75-100	60-100	50-85	25-55
[2]44B2, [2]44C2, [2]44D2, [2]44E2:											
Frederick	0-7	Silt loam	ML, CL	A-4, A-6	0-5	75-95	70-95	60-90	50-80	<35	NP-15
	7-14	Clay loam, silty clay loam.	CL	A-6, A-7	0-5	85-100	75-100	70-95	50-90	30-45	10-25
	14-50	Clay, silty clay.	CH, MH	A-7	0-5	85-100	75-100	70-100	55-100	50-85	25-55
	50-70	Clay, silty clay, silty clay loam.	CH, MH	A-7	0-5	90-100	80-100	75-100	60-100	50-85	25-55
Christian	0-7	Silt loam	ML, CL	A-4, A-6	0-5	75-95	70-95	60-90	50-80	<35	NP-15
	7-13	Clay loam, silty clay loam, cherty loam.	CL, GC	A-6, A-7	0-5	75-100	65-100	55-95	40-90	30-45	10-25
	13-40	Clay, silty clay, cherty loam.	CH, MH, SC	A-7	0-5	75-100	65-100	55-100	40-100	50-85	25-55
	40-70	Clay, silty clay, silty clay loam.	CH, MH	A-7	0-5	90-100	80-100	75-100	60-100	50-85	25-55
[2]45C2, [2]45E2:											
Frederick	0-7	Silt loam	ML, CL	A-4, A-6	0-5	75-95	70-95	60-90	50-80	<35	NP-15
	7-14	Clay loam, silty clay loam.	CL	A-6, A-7	0-5	85-100	75-100	70-95	50-90	30-45	10-25
	14-50	Clay, silty clay.	CH, MH	A-7	0-5	85-100	75-100	70-100	55-100	50-85	25-55
	50-70	Clay, silty clay, silty clay loam.	CH, MH	A-7	0-5	90-100	80-100	75-100	60-100	50-85	25-55
Rock outcrop.											

See footnotes at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
[2]46B, [2]46C:											
Frederick----------	0-7	Cherty silt loam	ML, CL, GM	A-1, A-2, A-4, A-6	0-20	40-95	30-70	30-70	20-60	<35	NP-15
	7-14	Clay loam, silty clay loam.	CL	A-6, A-7	0-5	85-100	75-100	70-95	50-90	30-45	10-25
	14-50	Clay, silty clay.	CH, MH	A-7	0-5	85-100	75-100	70-100	55-100	50-85	25-55
	50-70	Clay, silty clay, silty clay loam.	CH, MH	A-7	0-5	90-100	80-100	75-100	60-100	50-85	25-55
Nixa---------------	0-15	Cherty silt loam	GM, SM, GC, CL	A-4	5-25	60-85	50-75	45-70	35-65	<25	NP-8
	15-34	Cherty silt loam, cherty silty clay loam, cherty clay loam.	GC, GM, SC, SM	A-1, A-2, A-4	0-10	40-70	30-60	25-55	20-50	<30	NP-8
	34-64	Cherty silt loam, cherty silty clay loam, cherty clay loam.	GM, GC, GP-GM	A-1, A-2	10-30	15-45	5-40	5-35	5-30	<30	NP-8
47C---------------- Guernsey	0-6	Silt loam--------	ML, CL-ML	A-4, A-6	0-2	90-100	80-100	75-95	70-90	25-40	4-14
	6-13	Silty clay loam clay loam.	CL, ML, CH	A-6, A-7	0-2	80-100	70-100	65-100	60-95	35-60	11-30
	13-40	Silty clay, shaly silty clay loam.	CH, CL, MH	A-7	0-5	55-80	55-60	50-60	50-60	45-65	18-35
	40-60	Shaly silty clay loam.	GC	A-2, A-6	5-25	40-55	35-50	30-50	30-45	40-70	15-35
	60	----------------	---	---	---	---	---	---	---	---	---
48E---------------- Hartleton	0-6	Channery loam---	SM, ML	A-4	17-40	80-95	70-90	60-90	45-80	---	---
	6-33	Channery loam, very channery loam, very channery clay loam.	GM, ML, GC, CL	A-2, A-4	25-65	60-90	45-80	40-80	30-75	20-30	NP-7
	33-50	Very channery loam, very shaly clay loam.	SM, GM, GC, CL	A-1, A-2, A-4	55-85	40-80	25-70	20-70	15-60	20-30	NP-7
	50	Weathered bedrock.	---	---	---	---	---	---	---	---	---
[2]49F--------------- Hartleton	0-6	Very stony loam	SM, ML	A-4	20-40	80-95	70-90	60-90	45-80	---	---
	6-33	Channery loam, very channery loam, very channery clay loam.	GM, ML, GC, CL	A-2, A-4	25-65	60-90	45-80	40-80	30-75	20-30	NP-7
	33-50	Very channery loam, very shaly clay loam.	SM, GM, GC, CL	A-1, A-2, A-4	55-85	40-80	25-70	20-70	15-60	20-30	NP-7
	50	Weathered bedrock.	---	---	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
50D, 50E----------- Hazleton	0-10	Very stony sandy loam.	ML, GM, SM	A-4, A-2	3-10	60-100	50-100	50-90	30-75	---	---
	10-27	Channery sandy loam, channery loam.	GM, SM, ML, SC	A-2, A-4	0-50	60-85	55-80	50-70	20-55	<30	NP-8
	27-68	Channery loam, very channery sandy loam, very channery loamy sand.	GM, SM, GM-GC, SM-SC	A-2, A-1, A-4	5-30	55-80	50-75	45-65	15-50	<30	NP-8
[2]51D, [2]51F--------- Hazleton	0-10	Extremely stony sandy loam.	GM, SM, ML	A-4, A-2	5-15	60-100	50-100	50-90	30-75	---	---
	10-27	Channery sandy loam, channery loam.	GM, SM, ML, SC	A-2, A-4	0-50	60-85	55-80	50-70	20-55	<30	NP-8
	27-68	Channery loam, very channery sandy loam, very channery loamy sand.	GM, SM, GM-GC, SM-SC	A-2, A-1, A-4	5-30	55-80	50-75	45-65	15-50	<30	NP-8
[2]52F:											
Hazleton----------	0-10	Extremely stony sandy loam.	GM, SM, ML	A-4, A-2	5-15	60-100	50-100	50-90	30-75	---	---
	10-27	Channery sandy loam, channery loam.	GM, SM, ML, SC	A-2, A-4	0-50	60-85	55-80	50-70	20-55	<30	NP-8
	27-68	Channery loam, very channery sandy loam, very channery loamy sand.	GM, SM, GM-GC, SM-SC	A-2, A-1, A-4	5-30	55-80	50-75	45-65	15-50	<30	NP-8
Lehew-------------	0-7	Very stony sandy loam.	CL-ML, SM	A-2, A-4	3-15	50-90	45-80	40-75	20-55	10-32	NP-7
	7-32	Channery sandy loam, channery fine sandy loam, very channery loam.	SM, GM	A-2, A-4	10-60	45-60	30-50	20-45	10-40	20-40	1-10
	32	Weathered bedrock.	---	---	---	---	---	---	---	---	---
53C, 53D----------- Jefferson	0-13	Cobbly fine sandy loam.	SM, ML	A-2, A-4	15-45	75-90	70-90	50-80	30-65	<25	NP-4
	13-44	Gravelly loam, clay loam, sandy clay loam.	SM, SC, ML, CL	A-4, A-2, A-6	5-20	75-90	70-90	50-80	30-70	15-35	2-15
	44-65	Very cobbly clay loam, very gravelly fine sandy loam.	GM, GC	A-2, A-4, A-1	20-45	45-55	35-45	25-45	15-40	20-40	NP-10

See footnotes at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
54C, 54E----------- Leetonia	0-7	Very stony loamy sand.	GW, GM, SW, SM	A-1, A-2	35-50	45-85	35-70	20-55	2-20	---	NP
	7-20	Gravelly loamy sand, very gravelly sand.	GW, GM, SW, SM	A-1, A-2	35-50	45-85	35-70	20-55	2-20	---	NP
	20-45	Very gravelly sand, very gravelly loamy sand.	GW, GM, SW, SM	A-1	30-40	45-60	35-50	20-35	2-15	---	NP
	45	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
55D, 56D----------- Lehew	0-7	Fine sandy loam	ML, SM	A-2, A-4	0-5	80-100	80-100	60-95	30-75	20-45	1-10
	7-32	Channery sandy loam, channery fine sandy loam, very channery loam.	SM, GM	A-2, A-4	10-50	45-60	30-50	20-45	10-40	20-40	1-10
	32	Weathered bedrock.	---	---	---	---	---	---	---	---	---
57E, 57F----------- Lehew	0-7	Channery fine sandy loam.	GM, GC, ML	A-2, A-4	5-30	50-80	45-70	40-65	25-60	25-45	1-10
	7-32	Channery sandy loam, channery fine sandy loam, very channery loam.	SM, GM	A-2, A-4	10-50	45-60	30-50	20-45	10-40	20-40	1-10
	32	Weathered bedrock.	---	---	---	---	---	---	---	---	---
58D---------------- Lew	0-21	Very stony silt loam.	ML, GM, CL	A-2, A-4	15-70	35-85	30-75	28-70	25-60	<28	NP-8
	21-72	Channery silty clay loam, very channery silty clay loam, channery clay loam.	ML, MH, GM, SM	A-2, A-4, A-6	15-70	40-90	30-75	28-75	25-70	32-56	8-20
59E, 59F----------- Lew	0-21	Very stony silt loam.	ML, GM, CL	A-2, A-4	15-70	35-85	30-75	28-70	25-60	<28	NP-8
	21-60	Channery silty clay loam, very channery silty clay loam, channery clay loam.	ML, MH, GM, SM	A-2, A-4, A-6	15-70	40-90	30-75	28-75	25-70	32-56	8-20
60----------------- Massanetta	0-9	Silt loam-------	ML, CL	A-4	0-5	90-100	85-100	75-95	55-80	12-30	2-10
	9-44	Clay loam, silty clay loam, silt loam.	CL	A-6	0-5	90-100	85-100	75-95	55-85	25-40	10-20
	44-74	Variable--------	---	---	---	---	---	---	---	---	---
61B---------------- Millrock	0-8	Loamy fine sand	SM	A-2, A-4, A-1	0	95-100	85-100	45-85	15-40	<20	NP
	8-43	Loamy sand, loamy fine sand.	SP-SM, SM	A-1, A-2, A-4	0	95-100	90-100	45-70	10-40	<20	NP
	43-60	Loamy sand, loamy fine sand.	SP-SM, SM	A-1, A-2, A-4	0-20	95-100	90-100	45-75	10-40	<20	NP

See footnotes at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
62B, 62C----------- Monongahela	0-9	Fine sandy loam	ML, SM, CL-ML, SM-SC	A-4	0-5	90-100	85-100	75-100	45-90	20-35	1-10
	9-28	Loam, clay loam, sandy clay loam.	ML, CL, SM, SC	A-4, A-6	0-10	90-100	90-100	75-100	40-80	20-40	5-15
	28-53	Loam, clay loam, fine sandy loam.	ML, CL, SM, SC	A-4, A-6	0-10	80-100	75-100	60-95	40-80	20-40	1-15
	53-62	Stratified sandy loam to clay loam.	ML, CL, SM, SC	A-4, A-6	5-20	75-100	60-100	60-95	40-95	20-40	1-15
63B, 63C----------- Monongahela	0-9	Cobbly fine sandy loam.	ML, SM, CL-ML, SM-SC	A-4	0-15	80-90	75-85	70-80	45-75	20-35	1-10
	9-28	Loam, clay loam, sandy clay loam.	ML, CL	A-4, A-6	0-10	90-100	90-100	75-100	40-80	20-40	5-15
	28-53	Loam, clay loam, fine sandy loam.	ML, CL, SM, SC	A-4, A-6	0-10	80-100	75-100	60-95	40-80	20-40	1-15
	53-62	Stratified sandy loam to clay loam.	ML, CL, SM, SC	A-4, A-6	5-20	75-100	60-100	60-95	40-95	20-40	1-15
64C, 64D----------- Nixa	0-15	Very cherty silt loam.	GM, SM, GC, SC	A-1, A-2, A-4	25-35	40-70	30-50	25-55	20-50	<25	NP-8
	15-40	Very cherty silt loam, cherty silty clay loam, cherty clay loam.	GC, GM, SC, SM	A-1, A-2, A-4	20-30	40-70	30-60	25-55	20-50	<30	NP-8
	40-64	Very cherty silt loam, cherty silty clay loam, cherty clay loam.	GM, GC	A-1, A-2, A-4	20-30	40-60	30-50	25-50	20-45	<30	NP-8
[2]65E: Opequon-----------	0-6	Silty clay loam	CL, MH, CH	A-6, A-7	0-5	85-100	80-100	80-100	75-95	35-70	15-40
	6-13	Clay------------	CH, CL	A-6, A-7	0-10	90-100	90-100	80-100	65-95	35-90	20-50
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
66----------------- Philo	0-33	Silt loam, sandy loam.	ML, SM	A-2, A-4	0-5	95-100	80-100	50-90	30-80	20-40	1-10
	33-60	Stratified sand to silt loam.	GM, SM, ML	A-2, A-4	15-25	60-95	35-85	20-80	15-65	20-40	1-10
[2]66X. Pits and dumps											
67----------------- Purdy	0-3	Silt loam-------	ML, CL	A-4, A-6, A-7	0	95-100	90-100	90-100	90-100	25-50	2-25
	3-43	Silty clay, clay, silty clay loam.	ML, CL, CH	A-4, A-6, A-7	0	95-100	90-100	85-100	75-85	25-75	2-45
	43-60	Silty clay, very cobbly clay loam, clay.	ML, CL, CH, GC	A-4, A-2, A-6, A-7	0-30	95-100	35-100	35-100	30-95	25-75	2-45
[2]68E: Rock outcrop.											

See footnotes at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
[2]68E:											
Chilhowie---------	0-7	Silty clay loam	MH, ML	A-7	0-10	90-100	85-100	80-100	70-95	40-65	15-30
	7-17	Clay, silty clay	CH, MH	A-7	0-10	90-100	85-100	80-100	75-95	50-65	20-35
	17-22	Very channery clay, very channery silty clay, flaggy clay.	CH, GC, MH, GM	A-7, A-2	10-30	25-80	15-65	15-65	15-60	50-65	20-35
	22	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
[2]69F:											
Rock outcrop.											
Drall-------------	0-10	Extremely stony sandy loam.	SM	A-1, A-2	20-40	70-85	60-80	30-60	10-30	10-15	NP
	10-31	Very channery loamy sand, very channery loamy fine sand, very channery sand.	GW, GM, SW, SM	A-1, A-2	20-50	50-80	40-75	20-55	2-20	10-15	NP
	31-58	Channery sand, very channery sand, channery loamy sand.	GW, GM, SW, SM	A-1, A-2	35-80	45-80	35-70	20-55	2-20	10-15	NP
	58	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
[2]70C, [2]70E:											
Rock outcrop.											
Frederick---------	0-7	Silt loam-------	ML, CL	A-4, A-6	0-5	75-95	70-95	60-90	50-80	<35	NP-15
	7-14	Clay loam, silty clay loam.	CL	A-6, A-7	0-5	85-100	75-100	70-95	50-90	30-45	10-25
	14-50	Clay, silty clay.	CH, MH	A-7	0-5	85-100	75-100	70-100	50-100	50-85	25-55
	50-70	Clay, silty clay, silty clay loam.	CH, MH	A-7	0-5	90-100	80-100	75-100	60-100	50-85	25-55
[2]71.											
Rubble land											
72F---------------- Rushtown	0-10	Shaly silt loam	GM, ML, SM	A-2, A-4, A-1	0	40-75	35-70	30-70	20-65	25-40	1-10
	10-25	Shaly silt loam, very shaly silt loam.	GM	A-1, A-2, A-4	0	30-60	25-55	25-55	20-50	25-40	1-10
	25-60	Very shaly silt loam, very shaly loam.	GM, GP	A-1, A-2	0	10-35	5-30	5-30	3-25	25-40	1-10
73B2, 73C2--------- Sequoia	0-8	Silt loam-------	CL, CL-ML, ML	A-4, A-6	0	95-100	95-100	85-95	80-95	23-35	5-15
	8-32	Silty clay, clay, shaly clay.	CL, MH, CH	A-7	0	70-100	65-100	60-95	55-95	43-74	20-40
	32-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
[2]74B2, [2]74C2, [2]74D2:											
Sequoia----------	0-8	Silt loam-------	CL, CL-ML, ML	A-4, A-6	0	95-100	95-100	85-95	80-95	23-35	5-15
	8-32	Silty clay, clay, shaly clay.	CL, MH, CH	A-7	0	70-100	65-100	60-95	55-95	43-74	20-40
	32-60	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Berks------------	0-10	Shaly silt loam	GM, ML, GC, SC	A-2, A-4	0-30	50-80	45-70	40-60	30-55	25-36	5-10
	10-19	Shaly loam, very shaly loam, shaly silt loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	19-30	Shaly loam, very shaly loam, shaly silt loam.	GM, GC, SM, SC	A-1, A-2-4	0-40	35-65	25-55	20-40	15-35	24-38	2-10
	30	Weathered bedrock.	---	---	---	---	---	---	---	---	---
75B2, 75C2, 75D2--- Shenval	0-9	Loam------------	SM, ML, CL	A-2, A-4, A-6	0-5	85-100	75-95	55-95	30-85	15-35	NP-15
	9-76	Clay loam, clay	MH, CH	A-7	0-10	75-100	75-100	70-100	55-100	45-85	20-46
76C, 76D----------- Shenval	0-9	Cobbly loam-----	SM, ML, CL	A-4, A-6	15-30	80-95	80-90	60-90	35-70	15-35	NP-15
	9-76	Clay loam, clay	MH, CH	A-7	0-10	75-100	75-100	70-100	55-100	45-85	20-46
77C, 77D----------- Sherando	0-6	Sandy loam------	SM	A-2, A-4	0-20	80-95	75-90	45-70	20-45	<25	NP-5
	6-15	Gravelly sandy loam, cobbly sandy loam.	SM, GM, SM-SC	A-2, A-1	5-50	50-80	40-75	25-50	12-30	<30	NP-9
	15-55	Very gravelly sandy loam, very cobbly sandy loam, gravelly sandy loam.	GM, SM	A-2, A-1	5-70	30-75	30-70	20-60	12-30	<25	NP-9
	55-75	Very gravelly loamy sand, very cobbly loamy sand.	GM, SM, SP-SM	A-2, A-1	5-70	40-60	35-55	20-35	5-15	<21	NP
78C, 78E----------- Sherando	0-6	Cobbly sandy loam.	SM, GM	A-2, A-4, A-1	5-50	50-80	40-75	25-60	12-40	<25	NP-5
	6-15	Gravelly sandy loam, cobbly sandy loam.	SM, GM, SM-SC	A-2, A-1	5-50	50-80	40-75	25-50	12-30	<30	NP-9
	15-55	Very gravelly sandy loam, very cobbly sandy loam, gravelly sandy loam.	GM, SM	A-2, A-1	5-70	30-75	30-70	20-60	12-30	<25	NP-9
	55-75	Very gravelly loamy sand, very cobbly loamy sand.	GM, SM, SP-SM	A-2, A-1	5-70	40-60	35-55	20-35	5-15	<21	NP

See footnotes at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
79B---------------- Timberville	0-9	Silt loam-------	ML, CL-ML, SM	A-4	0-5	75-100	75-100	50-95	35-85	10-25	NP-7
	9-27	Silt loam, silty clay loam, cherty loam.	CL, CL-ML, GC, GM-GC	A-4, A-6	0-10	55-100	50-100	40-90	35-85	15-40	5-20
	27-60	Variable--------	---	---	---	---	---	---	---	---	---
80B---------------- Timberville	0-9	Cherty silt loam	ML, GM, CL-ML, SM	A-4, A-2	0-10	55-80	50-75	35-70	25-65	10-25	NP-7
	9-27	Silt loam, silty clay loam, cherty loam.	CL, CL-ML, GC, GM-GC	A-4, A-6	0-10	55-100	50-100	40-90	35-85	15-40	5-20
	27-60	Variable--------	---	---	---	---	---	---	---	---	---
81----------------- Tioga	0-9	Fine sandy loam	ML, SM	A-4	0-5	80-100	70-100	65-95	40-85	<15	NP-4
	9-30	Loam, fine sandy loam.	SM, ML	A-2, A-4	0	90-100	90-100	65-95	40-75	<15	NP-2
	30-60	Loam, gravelly loam, very gravelly loamy sand.	GW-GM, GM, SM, ML	A-1, A-2, A-4	0-10	35-100	30-100	15-100	5-90	<15	NP-2
[2]82. Udifluvents											
[2]83, [2]84, [2]85. Udorthents											
86B, 86C2, 86D2---- Unison	0-9	Loam------------	CL, ML	A-4, A-6	0-25	75-100	70-100	60-95	50-90	20-38	2-15
	9-60	Clay loam, clay	CL, MH	A-6, A-7	0-25	75-100	65-100	60-100	55-95	35-60	15-25
	60-77	Variable--------	---	---	---	---	---	---	---	---	---
87B, 87C, 87E------ Unison	0-9	Cobbly loam-----	CL, ML	A-4, A-6	25-45	80-95	70-90	60-85	55-80	20-35	2-15
	9-60	Clay loam, clay	CL, MH	A-6, A-7	0-25	75-100	65-100	60-100	55-95	35-60	15-25
	60-77	Variable--------	---	---	---	---	---	---	---	---	---
[2]88. Urban land											
89D3, 89E3, 89F3--- Weikert	0-13	Very shaly silt loam.	GM	A-2	0-10	35-50	25-40	20-40	20-35	30-40	4-10
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
[2]90D2, [2]90E3: Weikert-----------	0-13	Very shaly silt loam.	GM	A-2	0-10	35-50	25-40	20-40	20-35	30-40	4-10
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
[2]90D2, [2]90E3:											
Berks-------------	0-10	Shaly silt loam	GM, ML, GC, SC	A-2, A-4	0-30	50-80	45-70	40-60	30-55	25-36	5-10
	10-19	Shaly loam, very shaly loam, shaly silt loam.	GM, GC, SM, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	19-30	Shaly loam, very shaly loam, shaly silt loam.	GM, GC, SM, SC	A-1, A-2-4	0-40	35-65	25-55	20-40	15-35	24-38	2-10
	30	Weathered bedrock.	---	---	---	---	---	---	---	---	---
91B, 91C2---------- Wheeling	0-10	Silt loam-------	ML, CL, SM	A-4, A-6, A-7	0	90-100	90-100	85-100	45-90	20-50	1-25
	10-36	Silty clay loam, loam.	ML, CL, SM	A-4, A-6, A-7	0-5	90-100	80-100	75-100	45-80	20-50	1-25
	36-61	Loam, sandy clay loam.	ML, CL, SM	A-4	0-5	85-100	75-100	65-90	40-55	0-40	NP-10
92B, 92C2---------- Wheeling	0-10	Gravelly loam---	ML, CL, SM	A-4, A-6, A-7	0-5	75-85	60-70	55-70	45-65	20-50	1-25
	10-36	Silty clay loam, loam.	ML, CL, SM	A-4, A-6, A-7	0-5	90-100	80-100	75-100	45-80	20-50	1-25
	36-61	Loam, sandy clay loam.	ML, CL, SM	A-4	0-5	85-100	75-100	65-90	40-55	0-40	NP-10

[1]NP means nonplastic.
[2]See the map unit description for the composition and behavior of the entire unit.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means greater than. The erosion tolerance factor (T) is for the entire profile. Absence of an entry means data were not available or were not estimated]

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T
	In	In/hr	In/in	pH			
1B---------------- Allegheny	0-6	2.0-6.0	0.12-0.16	3.6-5.5	Low------------	0.28	4
	6-34	0.6-2.0	0.13-0.18	3.6-5.5	Low------------	0.28	
	34-60	0.6-2.0	0.08-0.17	3.6-5.5	Low------------	0.28	
[1]2B-------------- Allegheny	0-6	2.0-6.0	0.07-0.15	3.6-5.5	Low------------	0.20	3
	6-34	0.6-2.0	0.08-0.19	3.6-5.5	Low------------	0.28	
	34-60	0.6-2.0	0.08-0.19	3.6-5.5	Low------------	0.28	
[1]3B, [1]3C:							
Allegheny--------	0-6	2.0-6.0	0.12-0.16	3.6-5.5	Low------------	0.28	4
	6-34	0.6-2.0	0.13-0.18	3.6-5.5	Low------------	0.28	
	34-60	0.6-2.0	0.08-0.17	3.6-5.5	Low------------	0.28	
Cotaco-----------	0-15	0.6-6.0	0.12-0.20	3.6-5.5	Low------------	0.37	3
	15-60	0.6-2.0	0.07-0.15	3.6-5.5	Low------------	0.28	
[1]4B, [1]4C:							
Allegheny--------	0-6	2.0-6.0	0.07-0.15	3.6-5.5	Low------------	0.20	3
	6-34	0.6-2.0	0.08-0.19	3.6-5.5	Low------------	0.28	
	34-60	0.6-2.0	0.08-0.19	3.6-5.5	Low------------	0.28	
Cotaco-----------	0-15	2.0-6.0	0.07-0.15	3.6-5.5	Low------------	0.24	3
	15-60	0.6-2.0	0.05-0.19	3.6-5.5	Low------------	0.28	
[1]5. Aqualfs							
[1]6. Aquents							
7---------------- Atkins	0-9	0.6-2.0	0.14-0.22	4.5-5.5	Low------------	---	---
	9-33	0.06-2.0	0.14-0.18	4.5-5.5	Low------------	---	
	33-67	0.2-6.0	0.08-0.18	4.5-5.5	Low------------	---	
8D, 8E, 8F-------- Berks	0-10	0.6-6.0	0.08-0.12	4.0-5.5	Low------------	0.28	3
	10-19	0.6-6.0	0.04-0.10	4.0-5.5	Low------------	0.17	
	19-30	2.0-6.0	0.04-0.10	4.0-6.0	Low------------	0.17	
	30	---	---	---	---------------	---	
[1]9B2, [1]9C2:							
Berks------------	0-10	0.6-6.0	0.08-0.12	3.6-5.5	Low------------	0.28	3
	10-19	0.6-6.0	0.04-0.10	3.6-5.5	Low------------	0.17	
	19-30	2.0-6.0	0.04-0.10	3.6-6.0	Low------------	0.17	
	30	---	---	---	---------------	---	
Weikert----------	0-5	2.0-6.0	0.08-0.14	4.5-5.5	Low------------	0.28	2
	5-13	2.0-6.0	0.04-0.08	4.5-5.5	Low------------	0.28	
	13	---	---	---	---------------	---	
10B2, 10C2, 10D2, 10E2------------ Bookwood	0-6	2.0-6.0	0.14-0.20	5.1-6.5	Low------------	0.32	3
	6-30	0.6-2.0	0.08-0.16	5.1-6.5	Low------------	0.28	
	30-36	2.0-6.0	0.05-0.14	5.1-6.5	Low------------	0.28	
11A, 11B---------- Buchanan	0-11	0.6-2.0	0.18-0.24	4.5-5.5	Low------------	0.43	3
	11-20	0.6-2.0	0.14-0.18	4.5-5.5	Low------------	0.43	
	20-44	0.06-0.6	0.08-0.12	4.5-5.5	Low------------	0.43	
	44-60	0.2-0.6	0.08-0.12	4.5-5.5	Low------------	0.43	
12B--------------- Buchanan	0-11	0.6-2.0	0.16-0.22	4.5-5.5	Low------------	0.43	3
	11-20	0.6-2.0	0.14-0.18	4.5-5.5	Low------------	0.43	
	20-44	0.06-0.6	0.08-0.12	4.5-5.5	Low------------	0.43	
	44-60	0.2-0.6	0.04-0.12	4.5-5.5	Low------------	0.43	

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T
	In	In/hr	In/in	pH			
[1]13C:							
Buchanan	0-11	0.6-2.0	0.18-0.24	4.5-5.5	Low	0.43	3
	11-20	0.6-2.0	0.14-0.18	4.5-5.5	Low	0.43	
	20-44	0.06-0.6	0.08-0.12	4.5-5.5	Low	0.43	
	44-60	0.2-0.6	0.04-0.12	4.5-5.5	Low	0.43	
Monongahela	0-9	0.6-2.0	0.18-0.24	4.5-5.5	Low	0.43	3
	9-28	0.6-2.0	0.14-0.18	4.5-5.5	Low	0.43	
	28-53	0.06-0.6	0.08-0.12	4.5-5.5	Low	0.43	
	53-62	0.2-0.6	0.08-0.12	4.5-5.5	Low	0.43	
14 Buckton	0-7	0.6-2.0	0.12-0.22	6.6-8.4	Low	0.37	4
	7-54	0.6-2.0	0.14-0.19	7.4-8.4	Low	0.37	
	54-90	0.6-2.0	0.06-0.19	7.4-8.4	Low	0.43	
15B, 15C Burketown	0-15	2.0-6.0	0.08-0.15	4.5-6.5	Low	0.43	3
	15-34	2.0-6.0	0.08-0.15	4.5-6.5	Low	0.43	
	34-48	0.06-0.2	0.08-0.12	4.5-6.5	Low	0.43	
	48-64	0.6-6.0	0.08-0.16	4.5-6.5	Low	0.43	
16E, 16F Cataska	0-7	0.6-2.0	0.10-0.14	4.5-5.5	Low	0.15	1
	7-17	0.6-2.0	0.04-0.09	4.5-5.5	Low	0.15	
	17-24	---	---	---	---	---	
	24	---	---	---	---	---	
17E Cataska	0-7	0.6-20	0.10-0.14	4.5-5.5	Low	0.15	1
	7-17	0.6-20	0.04-0.09	4.5-5.5	Low	0.15	
	17-24	---	---	---	---	---	
	24	---	---	---	---	---	
18 Chagrin	0-11	0.6-2.0	0.15-0.19	5.6-7.3	Low	---	---
	11-48	0.6-6.0	0.13-0.17	5.6-7.3	Low	---	
	48-72	0.6-6.0	0.04-0.16	5.6-7.3	Low	---	
19 Chavies	0-14	2.0-6.0	0.11-0.18	4.5-6.0	Low	0.24	4
	14-34	2.0-6.0	0.11-0.20	4.5-6.0	Low	0.24	
	34-62	2.0-20.0	0.02-0.15	4.5-6.0	Low	0.24	
20B2, 20C2, 21B3, 21C3, 21D3, 21E3 Chilhowie	0-7	0.2-2.0	0.14-0.18	6.1-7.8	Moderate	0.28	2
	7-17	0.06-0.2	0.10-0.15	6.1-7.8	Moderate	0.24	
	17-22	0.06-0.2	0.02-0.05	7.9-8.4	Moderate	0.24	
	22	---	---	---	---	---	
[1]22B2, [1]22C2, [1]22D2, [1]23C3, [1]23E3:							
Chilhowie	0-7	0.2-2.0	0.14-0.18	6.1-7.8	Moderate	0.28	2
	7-17	0.06-0.2	0.10-0.15	6.1-7.8	Moderate	0.24	
	17-22	0.06-0.2	0.02-0.05	7.9-8.4	Moderate	0.24	
	22	---	---	---	---	---	
Edom	0-8	0.6-2.0	0.14-0.20	5.1-7.8	Low	0.28	3
	8-40	0.2-2.0	0.10-0.14	5.1-7.8	Moderate	0.28	
	40-70	---	---	---	---	---	
24B2, 24C2, 24D2, 24E2, 25C2, 25D2 Christian	0-7	2.0-6.0	0.15-0.24	5.1-6.5	Low	0.32	4
	7-13	0.6-2.0	0.12-0.18	4.5-6.5	Moderate	0.37	
	13-40	0.6-2.0	0.09-0.18	4.5-6.0	Moderate	0.17	
	40-70	0.6-2.0	0.09-0.20	4.5-6.0	Moderate	0.17	
26 Cotaco Variant	0-8	0.6-2.0	0.17-0.21	4.5-5.5	Low	0.43	3
	8-61	0.2-0.6	0.13-0.21	4.5-5.5	Moderate	0.32	
	61-98	0.2-0.6	0.10-0.18	4.5-5.5	Moderate	0.28	

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T
	In	In/hr	In/in	pH			
27---------------- Craigsville	0-5	2.0-20	0.10-0.20	4.5-5.5	Low------------	0.24	3
	5-27	2.0-20	0.06-0.15	4.5-5.5	Low------------	0.17	
	27-60	>6.0	0.04-0.09	4.5-5.5	Low------------	0.17	
28---------------- Craigsville	0-5	2.0-20	0.07-0.15	4.5-5.5	Low------------	0.20	3
	5-27	2.0-20	0.06-0.15	4.5-5.5	Low------------	0.17	
	27-60	>6.0	0.04-0.09	4.5-5.5	Low------------	0.17	
29E, 29F--------- Drall	0-10	6.0-20	0.04-0.13	4.5-5.0	Low------------	0.17	3
	10-31	6.0-20	0.02-0.06	4.5-5.0	Low------------	0.17	
	31-58	6.0-20	0.02-0.06	4.5-5.0	Low------------	0.17	
	58	---	---	---	---------------	---	
30B2, 30C2, 30D2, 31B3, 31C3------ Edom	0-8	0.6-2.0	0.14-0.20	5.1-7.8	Low------------	0.28	3
	8-40	0.2-2.0	0.10-0.19	5.1-7.8	Moderate-------	0.28	
	40-70	---	---	---	---------------	---	
[1]32C2, [1]32E2: Edom------------	0-8	0.6-2.0	0.14-0.20	5.1-7.8	Low------------	0.28	3
	8-40	0.2-2.0	0.10-0.19	5.1-7.8	Moderate-------	0.28	
	40-70	---	---	---	---------------	---	
Rock outcrop.							
33E--------------- Elliber	0-11	0.6-6.0	0.04-0.10	3.6-5.5	Low------------	0.17	4-3
	11-63	0.6-6.0	0.04-0.10	3.6-5.5	Low------------	0.17	
[1]34F: Elliber----------	0-11	0.6-6.0	0.04-0.10	3.6-5.5	Low------------	0.17	4-3
	11-63	0.6-6.0	0.04-0.10	3.6-5.5	Low------------	0.17	
Jefferson--------	0-13	2.0-6.0	0.04-0.10	4.5-5.5	Low------------	0.28	4
	13-57	2.0-6.0	0.04-0.16	4.5-5.5	Low------------	0.28	
	57-65	2.0-20.0	0.04-0.08	4.5-5.5	Low------------	0.17	
35B2, 35C2, 36B2- Endcav	0-6	0.6-2.0	0.17-0.22	5.1-7.3	Low------------	0.37	3
	6-60	0.2-0.6	0.08-0.12	5.1-7.8	High-----------	0.20	
	60	---	---	---	---------------	---	
[1]37C2: Endcav-----------	0-6	0.6-2.0	0.17-0.22	5.1-7.3	Low------------	0.37	3
	6-60	0.2-0.6	0.08-0.12	5.1-7.8	High-----------	0.20	
	60	---	---	---	---------------	---	
Rock outcrop.							
38B, 38C--------- Ernest	0-11	0.6-2.0	0.14-0.20	5.1-5.5	Low------------	0.43	3
	11-26	0.6-2.0	0.12-0.16	4.5-5.5	Moderate-------	0.28	
	26-42	0.06-0.6	0.08-0.12	4.5-5.5	Moderate-------	0.28	
	42-60	0.06-0.6	0.08-0.12	4.5-5.5	Moderate-------	0.28	
[1]39. Fluvaquents							
[1]40B2, [1]40C2, [1]40D2, [1]40E2: Frederick-------	0-7	2.0-6.0	0.15-0.24	5.1-6.5	Low------------	0.32	4
	7-14	0.6-2.0	0.12-0.18	4.5-6.5	Moderate-------	0.37	
	14-50	0.6-2.0	0.09-0.18	4.5-6.0	Moderate-------	0.17	
	50-70	0.6-2.0	0.09-0.20	4.5-6.0	Moderate-------	0.17	
Christian-------	0-7	2.0-6.0	0.15-0.24	5.1-6.5	Low------------	0.32	4
	7-13	0.6-2.0	0.12-0.18	4.5-6.5	Moderate-------	0.37	
	13-40	0.6-2.0	0.09-0.18	4.5-6.0	Moderate-------	0.17	
	40-70	0.6-2.0	0.09-0.20	4.5-6.0	Moderate-------	0.17	

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T
	In	In/hr	In/in	pH			
[1]41B3, [1]41C3, [1]41D3:							
Frederick------	0-7	0.6-2.0	0.15-0.20	5.1-6.5	Moderate-------	0.37	4
	7-14	0.6-2.0	0.12-0.18	4.5-6.5	Moderate-------	0.37	
	14-50	0.6-2.0	0.09-0.18	4.5-6.0	Moderate-------	0.17	
	50-70	0.6-2.0	0.09-0.20	4.5-6.0	Moderate-------	0.17	
Christian------	0-7	0.6-2.0	0.15-0.20	5.1-6.5	Moderate-------	0.37	4
	7-13	0.6-2.0	0.12-0.18	4.5-6.5	Moderate-------	0.37	
	13-40	0.6-2.0	0.09-0.18	4.5-6.0	Moderate-------	0.17	
	40-70	0.6-2.0	0.09-0.20	4.5-6.0	Moderate-------	0.17	
[1]42B2, [1]42C2, [1]42D2, [1]42E2, [1]43C, [1]43D, [1]43E, [1]44B2, [1]44C2, [1]44D2, [1]44E2:							
Frederick------	0-7	2.0-6.0	0.08-0.24	5.1-6.5	Low------------	0.32	4
	7-14	0.6-2.0	0.12-0.18	4.5-6.5	Moderate-------	0.37	
	14-50	0.6-2.0	0.09-0.18	4.5-6.0	Moderate-------	0.17	
	50-70	0.6-2.0	0.09-0.20	4.5-6.0	Moderate-------	0.17	
Christian------	0-7	2.0-6.0	0.08-0.24	5.1-6.5	Low------------	0.32	4
	7-13	0.6-2.0	0.12-0.18	4.5-6.5	Moderate-------	0.37	
	13-40	0.6-2.0	0.09-0.18	4.5-6.0	Moderate-------	0.17	
	40-70	0.6-2.0	0.09-0.20	4.5-6.0	Moderate-------	0.17	
[1]45C2, [1]45E2:							
Frederick-------	0-7	2.0-6.0	0.15-0.24	5.1-6.5	Low------------	0.32	4
	7-14	0.6-2.0	0.12-0.18	4.5-6.5	Moderate-------	0.37	
	14-50	0.6-2.0	0.09-0.18	4.5-6.0	Moderate-------	0.17	
	50-70	0.6-2.0	0.09-0.20	4.5-6.0	Moderate-------	0.17	
Rock outcrop.							
[1]46B, [1]46C:							
Frederick-------	0-7	2.0-6.0	0.12-0.15	5.1-6.5	Low------------	0.32	4
	7-14	0.6-2.0	0.12-0.18	4.5-6.5	Moderate-------	0.37	
	14-50	0.6-2.0	0.09-0.18	4.5-6.0	Moderate-------	0.17	
	50-70	0.6-2.0	0.09-0.20	4.5-6.0	Moderate-------	0.17	
Nixa------------	0-15	0.6-2.0	0.08-0.10	4.5-5.5	Low------------	0.43	2
	15-34	<0.06	0.05-0.08	4.5-5.5	Low------------	0.43	
	34-64	<0.06	0.03-0.06	4.5-5.5	Low------------	0.37	
47C-------------- Guernsey	0-6	0.6-2.0	0.19-0.24	4.5-6.0	Low------------	0.43	5
	6-13	0.2-2.0	0.15-0.21	4.5-6.0	Low------------	0.43	
	13-40	0.06-0.6	0.10-0.15	5.1-7.8	Moderate-------	0.32	
	40-60	0.06-0.6	0.06-0.10	5.1-7.8	Moderate-------	0.32	
	60	---	---	---	--------------	---	
48E-------------- Hartleton	0-6	0.6-6.0	0.10-0.14	4.5-5.5	Low------------	0.24	3-2
	6-33	0.6-6.0	0.06-0.10	4.5-5.5	Low------------	0.17	
	33-50	0.6-6.0	0.04-0.08	4.5-5.5	Low------------	0.28	
	50	---	---	---	--------------	---	
[1]49F------------- Hartleton	0-6	0.6-6.0	0.10-0.14	4.5-5.5	Low------------	0.24	3-2
	6-33	0.6-6.0	0.06-0.10	4.5-5.5	Low------------	0.17	
	33-50	0.6-6.0	0.04-0.08	4.5-5.5	Low------------	0.28	
	50	---	---	---	--------------	---	
50D, 50E--------- Hazleton	0-10	2.0-6.0	0.10-0.16	3.6-5.5	Low------------	0.24	3-2
	10-27	2.0-20.0	0.08-0.12	3.6-5.5	Low------------	0.17	
	27-68	2.0-20.0	0.04-0.10	3.6-5.5	Low------------	0.17	

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T
	In	In/hr	In/in	pH			
[1]51D, [1]51F-------	0-10	2.0-6.0	0.10-0.16	3.6-5.5	Low------------	0.24	3-2
Hazleton	10-27	2.0-20.0	0.08-0.12	3.6-5.5	Low------------	0.17	
	27-68	2.0-20.0	0.04-0.10	3.6-5.5	Low------------	0.17	
[1]52F:							
Hazleton--------	0-10	2.0-6.0	0.10-0.16	3.6-5.5	Low------------	0.24	3-2
	10-27	2.0-20.0	0.08-0.12	3.6-5.5	Low------------	0.17	
	27-68	2.0-20.0	0.04-0.10	3.6-5.5	Low------------	0.17	
Lehew-----------	0-7	0.6-20	0.08-0.12	4.5-5.5	Low------------	0.24	3
	7-32	0.6-20	0.08-0.12	4.5-5.5	Low------------	0.17	
	32	0.6-20	0.06-0.10	4.5-5.5	Low------------	0.17	
53C, 53D---------	0-13	2.0-6.0	0.10-0.16	4.5-5.5	Low------------	0.28	4
Jefferson	13-44	2.0-6.0	0.10-0.16	4.5-5.5	Low------------	0.28	
	44-65	2.0-20.0	0.03-0.14	4.5-5.5	Low------------	0.17	
54C, 54E---------	0-7	2.0-6.0	0.03-0.05	4.5-5.0	Low------------	0.17	3
Leetonia	7-20	2.0-6.0	0.03-0.05	4.5-5.0	Low------------	0.17	
	20-45	6.0-20	0.02-0.03	4.5-5.0	Low------------	0.17	
	45	---	---	---	---------------	---	
55D, 56D---------	0-7	0.6-20.	0.08-0.12	4.5-5.5	Low------------	0.24	3
Lehew	7-32	0.2-20.	0.06-0.10	4.5-5.5	Low------------	0.17	
	32	---	---	---	---------------	---	
57E, 57F---------	0-7	0.6-20.	0.08-0.12	4.5-5.5	Low------------	0.17	3
Lehew	7-32	0.2-20.	0.06-0.10	4.5-5.5	Low------------	0.17	
	32	---	---	---	---------------	---	
58D--------------	0-21	0.6-6.0	0.13-0.15	4.5-5.5	Moderate--------	0.21	3
Lew	21-72	0.6-2.0	0.11-0.16	4.5-5.5	Moderate--------	0.17	
59E, 59F---------	0-21	0.6-6.0	0.13-0.15	4.5-5.5	Moderate--------	0.21	3
Lew	21-60	0.6-2.0	0.11-0.16	4.5-5.5	Moderate--------	0.17	
60---------------	0-9	0.6-2.0	0.14-0.20	7.4-8.4	Low------------	0.32	4
Massanetta	9-44	0.6-2.0	0.14-0.20	7.4-8.4	Low------------	0.37	
	44-74	---	---	---	---------------	---	
61B--------------	0-8	6.0-20	0.04-0.08	6.1-7.3	Low------------	0.17	2
Millrock	8-43	6.0-20	0.04-0.08	6.1-7.3	Low------------	0.17	
	43-60	6.0-20	0.04-0.08	6.1-7.3	Low------------	0.17	
62B, 62C---------	0-9	0.6-2.0	0.18-0.24	4.5-5.5	Low------------	0.43	3
Monongahela	9-28	0.6-2.0	0.14-0.18	4.5-5.5	Low------------	0.43	
	28-53	0.06-0.6	0.08-0.12	4.5-5.5	Low------------	0.43	
	53-62	0.2-0.6	0.08-0.12	4.5-5.5	Low------------	0.43	
63B, 63C---------	0-9	0.6-2.0	0.16-0.22	4.5-5.5	Low------------	0.43	3
Monongahela	9-28	0.6-2.0	0.14-0.18	4.5-5.5	Low------------	0.43	
	28-53	0.06-0.6	0.08-0.12	4.5-5.5	Low------------	0.43	
	53-62	0.2-0.6	0.08-0.12	4.5-5.5	Low------------	0.43	
64C, 64D---------	0-15	0.6-2.0	0.08-0.10	4.5-5.5	Low------------	0.43	2
Nixa	15-40	<0.06	0.05-0.08	4.5-5.5	Low------------	0.43	
	40-64	<0.06	0.03-0.06	4.5-5.5	Low------------	0.37	
[1]65E:							
Opequon----------	0-6	0.2-2.0	0.16-0.21	5.6-7.3	High-----------	0.43	2
	6-13	0.2-2.0	0.12-0.16	5.6-7.3	High-----------	0.28	
	13	---	---	---	---------------	---	
Rock outcrop.							
66---------------	0-33	0.2-2.0	0.12-0.20	4.5-6.0	Low------------	---	---
Philo	33-60	2.0-20.0	0.06-0.10	4.5-6.0	Low------------	---	

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T
	In	In/hr	In/in	pH			
[1]66X. Pits and dumps							
67----------------- Purdy	0-3	0.2-0.6	0.18-0.24	3.6-5.5	Moderate--------	0.43	3
	3-43	0.06-0.2	0.12-0.18	3.6-5.5	Moderate--------	0.28	
	43-60	0.06-0.2	0.10-0.16	3.6-5.5	Moderate--------	0.28	
[1]68E: Rock outcrop.							
Chilhowie--------	0-7	0.2-2.0	0.14-0.18	6.1-7.8	Moderate--------	0.28	2
	7-17	0.06-0.2	0.10-0.15	6.1-7.8	Moderate--------	0.24	
	17-22	0.06-0.2	0.02-0.05	7.9-8.4	Moderate--------	0.24	
	22	---	---	---	---------------	---	
[1]69F: Rock outcrop.							
Drall------------	0-10	6.0-20	0.04-0.13	4.5-5.0	Low-------------	0.17	3
	10-31	6.0-20	0.02-0.06	4.5-5.0	Low-------------	0.17	
	31-58	6.0-20	0.02-0.06	4.5-5.0	Low-------------	0.17	
	58	---	---	---	---------------	---	
[1]70C, [1]70E: Rock outcrop.							
Frederick--------	0-7	2.0-6.0	0.15-0.24	5.1-6.5	Low-------------	0.32	4
	7-14	0.6-2.0	0.12-0.18	4.5-6.5	Moderate--------	0.37	
	14-50	0.6-2.0	0.09-0.18	4.5-6.0	Moderate--------	0.17	
	50-70	0.6-2.0	0.09-0.20	4.5-6.0	Moderate--------	0.17	
[1]71. Rubble land							
72F---------------- Rushtown	0-10	>6.0	0.10-0.17	4.5-6.0	Low-------------	0.17	3
	10-25	>6.0	0.06-0.14	4.5-5.5	Low-------------	0.17	
	25-60	>6.0	0.03-0.12	4.5-5.5	Low-------------	0.17	
73B2, 73C2-------- Sequoia	0-8	0.6-2.0	0.17-0.20	4.5-5.5	Low-------------	0.37	3
	8-32	0.2-0.6	0.08-0.16	4.5-5.5	Moderate--------	0.24	
	32-60	---	---	---	---------------	---	
[1]74B2, [1]74C2, [1]74D2:							
Sequoia---------	0-8	0.6-2.0	0.17-0.20	4.5-5.5	Low-------------	0.37	3
	8-32	0.2-0.6	0.08-0.16	4.5-5.5	Moderate--------	0.24	
	32-60	---	---	---	---------------	---	
Berks-----------	0-10	0.6-6.0	0.08-0.12	3.6-5.5	Low-------------	0.28	3
	10-19	0.6-6.0	0.04-0.10	3.6-5.5	Low-------------	0.17	
	19-30	2.0-6.0	0.04-0.10	3.6-6.0	Low-------------	0.17	
	30	---	---	---	---------------	---	
75B2, 75C2, 75D2- Shenval	0-9	0.6-6.0	0.10-0.19	5.1-6.0	Low-------------	0.32	4
	9-76	0.6-2.0	0.12-0.17	4.5-6.0	Moderate--------	0.28	
76C, 76D---------- Shenval	0-9	0.6-6.0	0.08-0.15	5.1-6.0	Low-------------	0.28	4
	9-76	0.6-2.0	0.12-0.17	4.5-6.0	Moderate--------	0.28	
77C, 77D---------- Sherando	0-6	2.0-6.0	0.08-0.12	3.6-6.0	Low-------------	0.28	4
	6-15	2.0-6.0	0.06-0.10	4.5-5.5	Low-------------	0.20	
	15-55	2.0-20	0.05-0.08	4.5-5.5	Low-------------	0.20	
	55-75	>6.0	0.04-0.06	4.5-5.5	Low-------------	0.17	
78C, 78E---------- Sherando	0-6	2.0-6.0	0.06-0.10	3.6-6.0	Low-------------	0.24	3
	6-15	2.0-6.0	0.06-0.10	4.5-5.5	Low-------------	0.20	
	15-55	2.0-20	0.05-0.08	4.5-5.5	Low-------------	0.20	
	55-75	>6.0	0.04-0.06	4.5-5.5	Low-------------	0.17	

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
79B--------------- Timberville	0-9	2.0-6.0	0.11-0.18	5.1-6.5	Low------------	0.32	4
	9-27	0.6-2.0	0.11-0.19	4.5-6.0	Low------------	0.28	
	27-60	---	---	---	---------------	---	
80B--------------- Timberville	0-9	2.0-6.0	0.08-0.13	5.1-6.5	Low------------	0.32	4
	9-27	0.6-2.0	0.11-0.19	4.5-6.0	Low------------	0.28	
	27-60	---	---	---	---------------	---	
81--------------- Tioga	0-9	0.6-2.0	0.15-0.21	5.1-7.3	Low------------	---	---
	9-30	0.6-2.0	0.07-0.20	5.1-7.3	Low------------	---	
	30-60	0.6-20	0.02-0.20	5.6-7.8	Low------------	---	
[1]82. Udifluvents							
[1]83, [1]84, [1]85. Udorthents							
86B, 86C2, 86D2-- Unison	0-9	0.6-6.0	0.14-0.20	5.1-6.0	Low------------	0.32	4
	9-60	0.6-2.0	0.12-0.18	5.1-6.0	Moderate-------	0.28	
	60-77	---	---	---	---------------	---	
87B, 87C, 87E---- Unison	0-9	0.6-6.0	0.11-0.17	5.1-6.0	Low------------	0.28	4
	9-60	0.6-2.0	0.12-0.18	5.1-6.0	Moderate-------	0.28	
	60-77	---	---	---	---------------	---	
[1]88. Urban land							
89D3, 89E3, 89F3- Weikert	0-13	2.0-6.0	0.08-0.14	4.5-5.5	Low------------	0.28	2
	13	---	---	---	---------------	---	
[1]90D2, [1]90E3:							
Weikert---------	0-13	2.0-6.0	0.08-0.14	4.5-5.5	Low------------	0.28	2
	13	---	---	---	---------------	---	
Berks-----------	0-10	0.6-6.0	0.08-0.12	3.6-5.5	Low------------	0.28	3
	10-19	0.6-6.0	0.04-0.10	3.6-5.5	Low------------	0.17	
	19-30	2.0-6.0	0.04-0.10	3.6-6.0	Low------------	0.17	
	30	---	---	---	---------------	---	
91B, 91C2-------- Wheeling	0-10	0.6-6.0	0.17-0.20	5.1-6.0	Low------------	0.32	4
	10-36	0.6-2.0	0.14-0.19	5.1-6.0	Low------------	0.28	
	36-61	6.0-20	0.12-0.17	5.1-6.0	Low------------	0.24	
92B, 92C2-------- Wheeling	0-10	0.6-6.0	0.10-0.16	5.1-6.0	Low------------	0.24	4
	10-36	0.6-2.0	0.14-0.19	5.1-6.0	Low------------	0.28	
	36-61	6.0-20	0.12-0.17	5.1-6.0	Low------------	0.24	

[1]See the map unit description for the composition and behavior of the entire unit.

TABLE 15.--SOIL AND WATER FEATURES

[Absence of an entry indicates the feature is not a concern. See the Glossary for descriptions of symbols a "rare," "brief," and "perched." The symbol < means less than; > means greater than]

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Potenti frost actio
					Ft			In		
1B---------------- Allegheny	B	None to rare	---	---	>6.0	---	---	>60	Hard	Modera
[1]2B--------------- Allegheny	B	None to rare	---	---	>6.0	---	---	>60	Hard	Modera
[1]3B, [1]3C:										
Allegheny--------	B	None to rare	---	---	>6.0	Apparent	Dec-Apr	>60	Hard	Modera
Cotaco-----------	C	None to rare	---	---	1.5-2.5	Apparent	Nov-May	>60	---	---
[1]4B, [1]4C:										
Allegheny--------	B	None to rare	---	---	>6.0	---	---	>60	Hard	Modera
Cotaco-----------	C	None to rare	---	---	1.5-2.5	Apparent	Nov-May	>60	---	---
[1]5. Aqualfs										
[1]6. Aquents										
7----------------- Atkins	D	Common------	Very brief	Sep-Jul	0-1.0	Apparent	Nov-Jun	40-60	Hard	High--
8D, 8E, 8F-------- Berks	C	None--------	---	---	>6.0	---	---	20-40	Rippable	Low---
[1]9B2, [1]9C2:										
Berks------------	C	None--------	---	---	>6.0	---	---	20-40	Rippable	Low---
Weikert----------	C/D	None--------	---	---	>6.0	---	---	10-20	Rippable	Low---
10B2, 10C2, 10D2, 10E2------------- Bookwood	B	None--------	---	---	>6.0	---	---	20-40	Rippable	Modera
11A, 11B, 12B----- Buchanan	C	None--------	---	---	1.5-3.0	Perched	Dec-Apr	>60	---	High--
[1]13C:										
Buchanan---------	C	None--------	---	---	0.5-3.0	Perched	Nov-Mar	>60	---	Modera
Monongahela------	C	None--------	---	---	1.5-3.0	Perched	Dec-Apr	>60	---	High--
14---------------- Buckton	B	Occasional	Very brief	Dec-Jun	>6.0	---	---	>60	---	Modera
15B, 15C---------- Burketown	C	None--------	---	---	2.0-3.5	Perched	Nov-Apr	>60	---	Modera

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potent frost actio
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	
					Ft			In		
16E, 16F, 17E----- Cataska	D	None--------	---	---	>6.0	---	---	20-40	Hard	---
18--------------- Chagrin	B	Common------	Brief-----	Feb-Jun	4.0-6.0	Apparent	Feb-Mar	>60	---	Moderat
19--------------- Chavies	B	None to rare	---	---	>6.0	---	---	>60	---	---
20B2, 20C2, 21B3, 21C3, 21D3, 21E3- Chilhowie	C	None--------	---	---	>6.0	---	---	20-40	Hard	Moderat
[1]22B2, [1]22C2, [1]22D2, [1]23C3, [1]23E3:										
Chilhowie--------	C	None--------	---	---	>6.0	---	---	20-40	Hard	Moderat
Edom------------	C	None--------	---	---	4.0-7.0	Apparent	Nov-May	40-60	Rippable	Moderat
24B2, 24C2, 24D2, 24E2, 25C2, 25D2- Christian	B	None--------	---	---	>6.0	---	---	>60	---	Moderat
26--------------- Cotaco Variant	C	None--------	---	---	2.0-3.0	Perched	Dec-Apr	>60	---	Moderat
27, 28----------- Craigsville	B	Rare--------	Very brief	Nov-May	>6.0	---	---	>60	---	Moderat
29E, 29F---------- Drall	C	None--------	---	---	4.0-7.0	Apparent	---	40-80	Hard	Low----
30B2, 30C2, 30D2, 31B3, 31C3------- Edom	C	None--------	---	---	4.0-7.0	Apparent	Nov-May	40-60	Rippable	Moderat
[1]32C2, [1]32E2:										
Edom-------------	C	None--------	---	---	4.0-7.0	Apparent	Nov-May	40-60	Rippable	Moderat
Rock outcrop.										
33E--------------- Elliber	A	None--------	---	---	>6.0	---	---	>60	---	Moderat
[1]34F:										
Elliber----------	A	None--------	---	---	>6.0	---	---	>60	---	Moderat
Jefferson--------	B	None--------	---	---	4.0-6.0	Apparent	Feb-Apr	>60	---	---
35B2, 35C2, 36B2-- Endcav	C	None--------	---	---	>6.0	---	---	>40	Hard	Moderat

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potent fros actio
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	
					Ft			In		
[1]37C2:										
Endcav	C	None	---	---	>6.0	---	---	>40	Hard	Modera
Rock outcrop.										
38B, 38C Ernest	C	None	---	---	1.5-2.5	Perched	Dec-Apr	>60	---	Modera
[1]39. Fluvaquents										
[1]40B2, [1]40C2, [1]40D2, [1]40E2, [1]41B3, [1]41C3, [1]41D3, [1]42B2, [1]42C2, [1]42D2, [1]42E2, [1]43C, [1]43D, [1]43E, [1]44B2, [1]44C2, [1]44D2, [1]44E2:										
Frederick	B	None	---	---	>6.0	---	---	>60	---	Modera
Christian	B	None	---	---	>6.0	---	---	>60	---	Modera
[1]45C2, [1]45E2:										
Frederick	B	None	---	---	>6.0	---	---	>60	---	Modera
Rock outcrop.										
[1]46B, [1]46C:										
Frederick	B	None	---	---	>6.0	---	---	>60	---	Modera
Nixa	C	None	---	---	>6.0	---	---	40-60	Hard	---
47C Guernsey	C	None	---	---	1.5-4.0	Perched	Jan-Apr	>60	---	Modera
48E Hartleton	B	None	---	---	>6.0	---	---	>40	Rippable	Modera
[1]49F Hartleton	B	None	---	---	>6.0	---	---	40-60	Rippable	Modera
50D, 50E, [1]51D, [1]51F Hazleton	B	None	---	---	>6.0	---	---	40-60	Rippable	Modera
[1]52F:										
Hazleton	B	None	---	---	>6.0	---	---	40-60	Rippable	Modera
Lehew	C	None	---	---	4.0-6.0	Apparent	Dec-Apr	20-40	Hard	Low
53C, 53D Jefferson	B	None	---	---	4.0-6.0	Apparent	Feb-Apr	>60	---	---

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potenti frost action
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	
					Ft			In		
54C, 54E: Leetonia	C	None	---	---	4.0-7.0	Apparent	---	40-48	Hard	Low
55D, 56D, 57E, 57F: Lehew	C	None	---	---	4.0-6.0	Apparent	Dec-Apr	20-40	Hard	Low
58D, 59E, 59F: Lew	B	None	---	---	>6.0	---	---	>60	---	Moderat
60: Massanetta	B	Occasional	Very brief	May-Sep	2.0-3.5	Apparent	Jan-Apr	>60	---	Moderat
61B: Millrock	A	Frequent	Very brief	Dec-Sep	>6.0	---	---	>60	---	Low
62B, 62C, 63B, 63C: Monongahela	C	None	---	---	1.5-3.0	Perched	Dec-Apr	>60	---	High
64C, 64D: Nixa	C	None	---	---	>6.0	---	---	>60	---	---
[1]65E:										
Opequon	C	None	---	---	>6.0	---	---	12-20	Hard	Moderat
Rock outcrop.										
66: Philo	B	Common	Brief	Jan-Dec	1.5-3.0	Apparent	Dec-Apr	>40	Hard	Moderat
[1]66X. Pits and dumps										
67: Purdy	D	None	---	---	0-1.5	Apparent	Nov-Jun	>60	---	High
[1]68E:										
Rock outcrop.										
Chilhowie	C	None	---	---	>6.0	---	---	20-40	Hard	Moderat
[1]69F:										
Rock outcrop.										
Drall	C	None	---	---	4.0-7.0	Apparent	---	40-80	Hard	Low
[1]70C, [1]70E:										
Rock outcrop.										
Frederick	B	None	---	---	>6.0	---	---	>60	---	Moderat
[1]71. Rubble land										

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potent frost actio
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	
					Ft			In		
72F: Rushtown	A	None	---	---	>6.0	---	---	>60	---	Low
73B2, 73C2: Sequoia	C	None	---	---	>6.0	---	---	20-40	Rippable	---
[1]74B2, [1]74C2, [1]74D2:										
Sequoia	C	None	---	---	>6.0	---	---	20-40	Rippable	---
Berks	C	None	---	---	>6.0	---	---	20-40	Rippable	Low
75B2, 75C2, 75D2, 76C, 76D: Shenval	B	None	---	---	>6.0	---	---	>60	---	Modera
77C, 77D, 78C, 78E: Sherando	B	None	---	---	>6.0	---	---	>60	---	Low
79B, 80B: Timberville	B	Frequent	Very brief	Apr-Oct	>6.0	---	---	>60	---	Modera
81: Tioga	B	Common	Brief	Feb-Jun	3.0-6.0	Apparent	---	>60	---	Modera
[1]82. Udifluvents										
[1]83, [1]84, [1]85. Udorthents										
86B, 86C2, 86D2, 87B, 87C, 87E: Unison	B	None	---	---	>6.0	---	---	>60	---	Modera
[1]88. Urban land										
89D3, 89E3, 89F3: Weikert	C/D	None	---	---	>6.0	---	---	10-20	Rippable	Modera
[1]90D2, [1]90E3:										
Weikert	C/D	None	---	---	>6.0	---	---	10-20	Rippable	Modera
Berks	C	None	---	---	>6.0	---	---	20-40	Rippable	Low
91B, 91C2, 92B, 92C2: Wheeling	B	Rare	Brief	Jan-Dec	4.0-6.0	Apparent	Dec-Apr	>60	---	Modera

[1]See the map unit description for the composition and behavior of the entire unit.

TABLE 16.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Allegheny	Fine-loamy, mixed, mesic Typic Hapludults
Atkins	Fine-loamy, mixed, acid, mesic Typic Fluvaquents
Berks	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Bookwood	Fine-loamy, mixed, mesic Ultic Hapludalfs
Buchanan	Fine-loamy, mixed, mesic Aquic Fragiudults
Buckton	Fine-loamy, mixed (calcareous), mesic Typic Udifluvents
Burketown	Coarse-loamy, siliceous, mesic Typic Fragiudults
Cataska	Loamy-skeletal, mixed, mesic, shallow Typic Dystrochrepts
Chagrin	Fine-loamy, mixed, mesic Dystric Fluventic Eutrochrepts
Chavies	Coarse-loamy, mixed, mesic Ultic Hapludalfs
Chilhowie	Very-fine, mixed, mesic Typic Hapludalfs
Christian	Clayey, kaolinitic, mesic Typic Hapludults
Cotaco	Fine-loamy, mixed, mesic Aquic Hapludults
Cotaco variant	Clayey, mixed, mesic Aquic Hapludults
Craigsville	Loamy-skeletal, mixed, mesic Fluventic Dystrochrepts
Drall	Sandy-skeletal, siliceous, mesic Typic Udorthents
Edom	Fine, illitic, mesic Typic Hapludalfs
Elliber	Loamy-skeletal, mixed, mesic Typic Hapludults
Endcav	Very-fine, mixed, mesic Typic Hapludalfs
Ernest	Fine-loamy, mixed, mesic Aquic Fragiudults
Frederick	Clayey, kaolinitic, mesic Typic Paleudults
Guernsey	Fine, mixed, mesic Aquic Hapludalfs
Hartleton	Loamy-skeletal, mixed, mesic Typic Hapludults
Hazleton	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Jefferson	Fine-loamy, siliceous, mesic Typic Hapludults
Leetonia	Sandy-skeletal, siliceous, mesic Entic Haplorthods
Lehew	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Lew	Loamy-skeletal, mixed, mesic Typic Hapludults
Massanetta	Fine-loamy, carbonatic, mesic Fluvaquentic Hapludolls
Millrock	Mixed, mesic Alfic Udipsamments
Monongahela	Fine-loamy, mixed, mesic Typic Fragiudults
Nixa	Loamy-skeletal, siliceous, mesic Glossic Fragiudults
Opequon	Clayey, mixed, mesic Lithic Hapludalfs
Philo	Coarse-loamy, mixed, mesic Fluvaquentic Dystrochrepts
Purdy	Clayey, mixed, mesic Typic Ochraquults
Rushtown	Loamy-skeletal over fragmental, mixed, mesic Typic Dystrochrepts
Sequoia	Clayey, mixed, mesic Typic Hapludults
Shenval	Fine, mixed, mesic Typic Paleudalfs
Sherando	Loamy-skeletal, siliceous, mesic Typic Dystrochrepts
Timberville	Fine-loamy, mixed, mesic Fluventic Dystrochrepts
Tioga	Coarse-loamy, mixed, mesic Dystric Fluventic Eutrochrepts
Unison	Clayey, mixed, mesic Typic Hapludults
Weikert	Loamy-skeletal, mixed, mesic Lithic Dystrochrepts
Wheeling	Fine-loamy, mixed, mesic Ultic Hapludalfs

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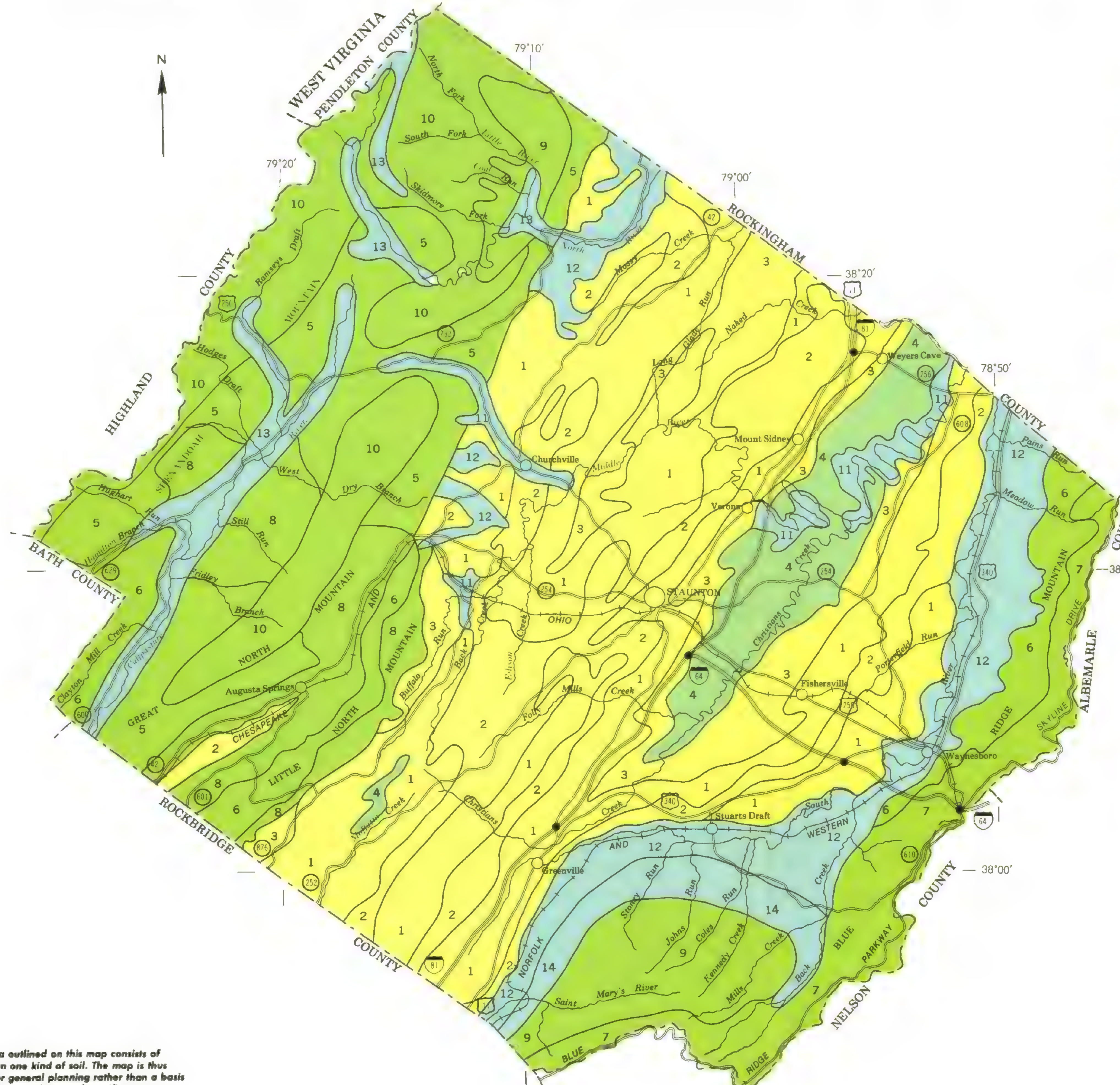


Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

SOIL ASSOCIATIONS

SOILS IN THE MAIN VALLEY FORMED IN RESIDUUM OF INTERBEDDED LIMESTONE, DOLOMITE, AND CALCAREOUS SHALE

1 Frederick-Christian-Rock outcrop: Deep, well drained soils that have a subsoil of clay loam to clay; and areas of Rock outcrop; all on limestone uplands

2 Frederick-Bolton-Christian: Deep to moderately deep, well drained soils that have a subsoil of clay loam to clay or gravelly loam to gravelly clay loam; on limestone uplands

3 Chilhowie-Edom: Moderately deep to deep, well drained soils that have a dominantly clayey subsoil; on limestone uplands

SOILS IN THE MAIN VALLEY FORMED IN RESIDUUM OF SHALE AND THIN INTERBEDDED SANDSTONE AND LIMESTONE

4 Berks-Weikert-Sequoia: Shallow to deep, well drained soils that have a subsoil of shaly silt loam shaly loam, or clay; on shale uplands

SOIL ON THE APPALACHIAN AND BLUE RIDGE MOUNTAINS FORMED IN RESIDUUM OF SANDSTONE, SHALE, AND GREENSTONE

5 Berks-Weikert-Rushtown: Shallow to deep, well drained soils that have a subsoil of shaly silt loam or shaly loam; on steep mountainous uplands

6 Hazleton: Deep, well drained soils that have a subsoil of channery sandy loam; on mountainous uplands

7 Lew-Cataska-Hartleton: Deep to moderately deep, excessively drained to well drained soils that have a channery or slaty subsoil; on mountainous uplands

8 Monongahela-Berks-Weikert: Deep to shallow, well drained to moderately well drained soils that have a dense, compact subsoil or a subsoil of shaly silt loam; on mountainsides and terraces

9 Drall-Hazleton-Leetonia: Deep, well drained to excessively drained soils that have a very channery or gravelly subsoil; on mountainous uplands

10 Lehew-Hazleton: Moderately deep to deep, well drained to excessively drained soils that have a channery or very channery subsoil; on mountainous uplands

SOILS ON FLOOD PLAINS, TERRACES, AND MOUNTAIN FOOT SLOPES FORMED IN ALLUVIAL OR COLLUVIAL MATERIAL

11 Buchanan-Wheeling-Buckton: Deep, somewhat poorly drained to well drained soils that have a dense, compact subsoil or a subsoil of silt loam, loam, or clay loam; on stream terraces and flood plains

12 Monongahela-Allegheny-Unison: Deep, moderately well drained to well drained soils that have a dense, compact subsoil or a subsoil of loam to clay; on stream terraces

13 Craigsville-Allegheny: Deep, well drained soils that have a subsoil of gravelly sandy loam or clay loam; on stream terraces

14 Sherando-Monongahela: Deep, somewhat excessively drained to moderately well drained soils that have a dense, compact subsoil or a subsoil of very gravelly sandy loam; on mountain foot slopes and terraces

Compiled 1978

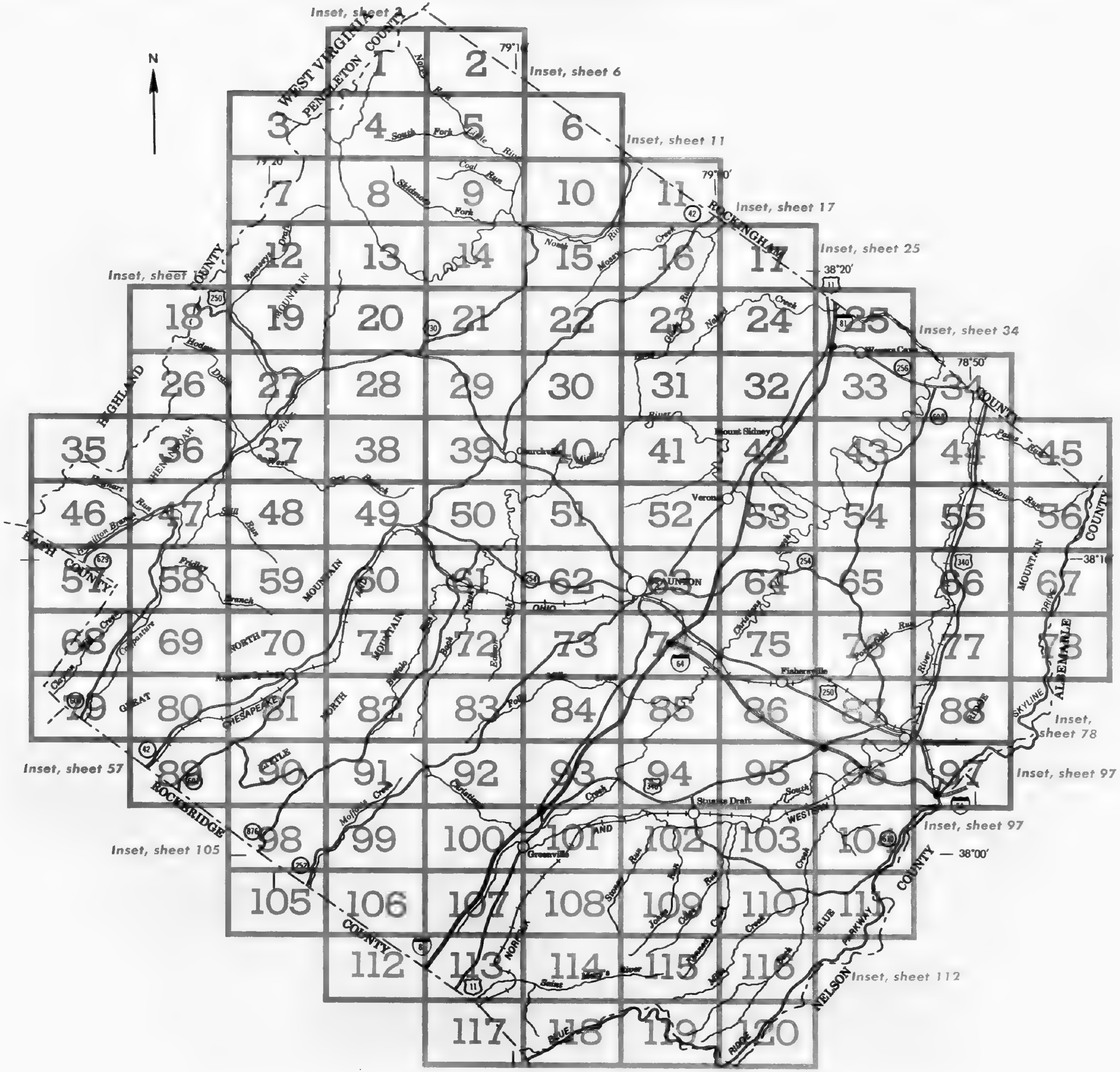
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
FOREST SERVICE
AND THE VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

GENERAL SOIL MAP
AUGUSTA COUNTY, VIRGINIA

Scale 1:253,440

1 0 1 2 3 4 Miles

1 0 1 2 3 4 Kilometers



INDEX TO MAP SHEETS
AUGUSTA COUNTY, VIRGINIA

Scale 1:253,440

1 0 1 2 3 4 Miles

1 0 1 2 3 4 Kilometers

SOIL LEGEND

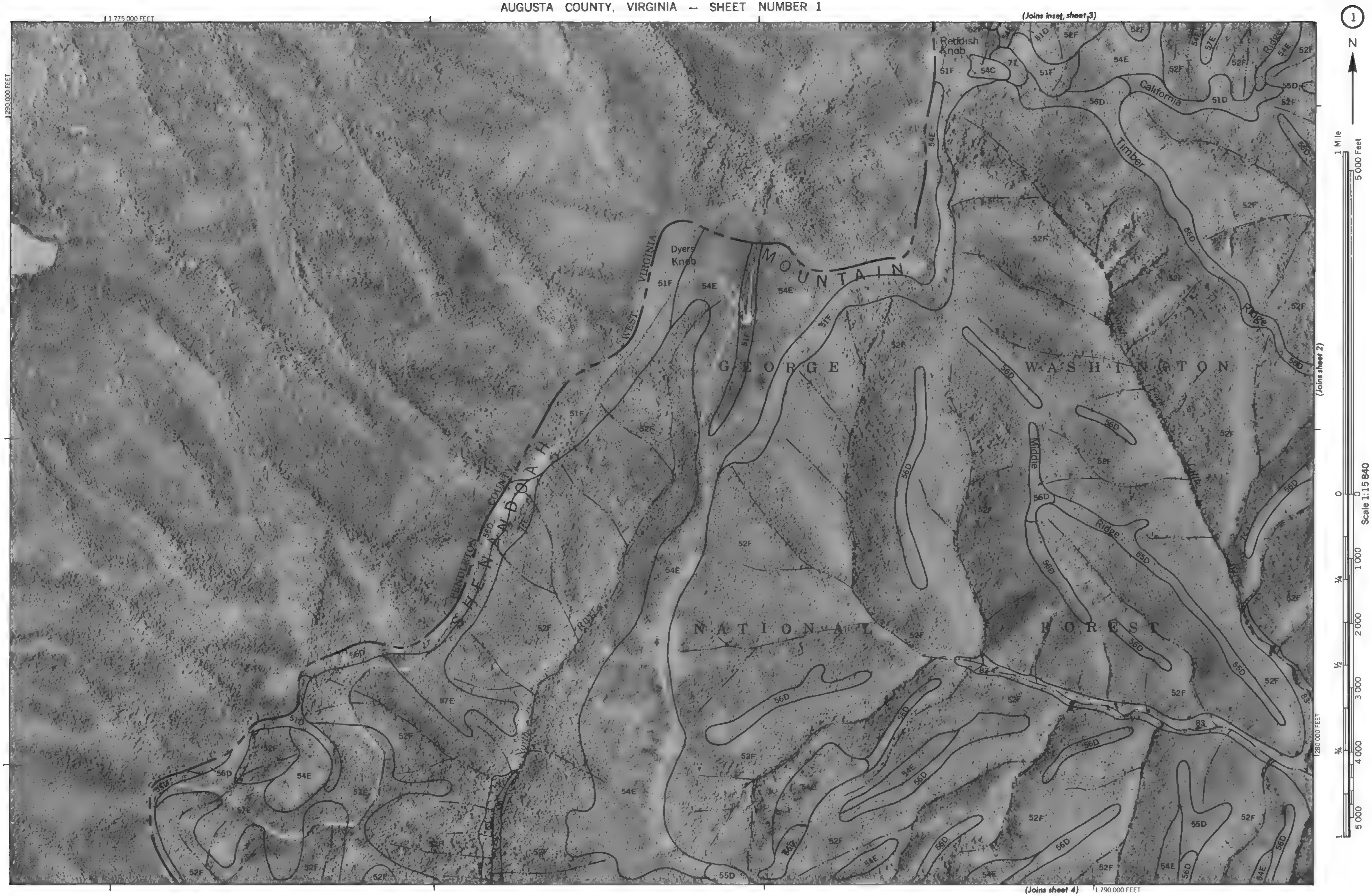
The first number(s) is the number of the series and its respective surface texture The capital letter shows the slope. Most symbols without a slope letter are those of nearly level soils, but some are for broadly defined units that have a considerable range of slope. A final number, 2, shows that the soil is eroded, and a number 3, shows that the soil is severely eroded.

SYMBOL	NAME
1B	Allegheny fine sandy loam, 1 to 7 percent slopes
2B	Allegheny cobbly soils, 1 to 7 percent slopes
3B	Allegheny-Cotaco fine sandy loams, 1 to 7 percent slopes
3C	Allegheny-Cotaco fine sandy loams, 7 to 15 percent slopes
4B	Allegheny-Cotaco cobbly fine sandy loams, 1 to 7 percent slopes
4C	Allegheny-Cotaco cobbly fine sandy loams, 7 to 15 percent slopes
5	Aqualfs, nearly level *
6	Aquents, loamy-skeletal *
7	Atkins fine sandy loam
8D	Berks channery silt loam, 7 to 25 percent slopes
8E	Berks channery silt loam, 25 to 45 percent slopes
8F	Berks channery silt loam, 45 to 60 percent slopes
9B2	Berks-Weikert shaly silt loams, 2 to 7 percent slopes, eroded
9C2	Berks-Weikert shaly silt loams, 7 to 15 percent slopes, eroded
10B2	Bookwood silt loam, 2 to 7 percent slopes, eroded
10C2	Bookwood silt loam, 7 to 15 percent slopes, eroded
10D2	Bookwood silt loam, 15 to 25 percent slopes, eroded
10E2	Bookwood silt loam, 25 to 45 percent slopes, eroded
11A	Buchanan fine sandy loam, 0 to 2 percent slopes
11B	Buchanan fine sandy loam, 2 to 7 percent slopes
12B	Buchanan cobbly fine sandy loam, 0 to 7 percent slopes
13C	Buchanan-Monongahela loams, 7 to 15 percent slopes
14	Buckton silt loam
15B	Burketown fine sandy loam, 0 to 7 percent slopes
15C	Burketown fine sandy loam, 7 to 15 percent slopes
16E	Cataska slaty silt loam, 15 to 45 percent slopes
16F	Cataska slaty silt loam, 45 to 70 percent slopes
17E	Cataska very stony silt loam, 25 to 50 percent slopes
18	Chagrin loam
19	Chavies fine sandy loam
20B2	Chilhowie silty clay loam, 2 to 7 percent slopes, eroded
20C2	Chilhowie silty clay loam, 7 to 15 percent slopes, eroded
21B3	Chilhowie sdhaly silty clay loam, 2 to 7 percent slopes, severely eroded
21C3	Chilhowie shaly silty clay loam, 7 to 15 percent slopes, severely eroded
21D3	Chilhowie shaly silty clay loam, 15 to 25 percent slopes, severely eroded
21E3	Chilhowie shaly silty clay loam, 25 to 45 percent slopes, severely eroded
22B2	Chilhowie-Edom complex, 2 to 7 percent slopes, eroded
22C2	Chilhowie-Edom complex, 7 to 15 percent slopes, eroded
22D2	Chilhowie-Edom complex, 15 to 25 percent slopes, eroded
23C3	Chilhowie-Edom shaly silty clay loams, 7 to 15 percent slopes, severely eroded
23E3	Chilhowie-Edom shaly silty clay loams, 15 to 45 percent slopes, severely eroded
24B2	Christian fine sandy loam, 2 to 7 percent slopes, eroded
24C2	Christian fine sandy loam, 7 to 15 percent slopes, eroded
24D2	Christian fine sandy loam, 15 to 25 percent slopes, eroded
24E2	Christian fine sandy loam, 25 to 45 percent slopes, eroded
25C2	Christian cherty fine sandy loam, 7 to 15 percent slopes, eroded
25D2	Christian cherty fine sandy loam, 15 to 25 percent slopes, eroded
26	Cotaco Variant silt loam
27	Craigsville fine sandy loam
28	Craigsville cobbly fine sandy loam
29E	Drall extremely stony sandy loam, 15 to 45 percent slopes
29F	Drall extremely stony sandy loam, 45 to 80 percent slopes
30B2	Edom silt loam, 2 to 7 percent slopes, eroded
30C2	Edom silt loam, 7 to 15 percent slopes, eroded
30D2	Edom silt loam, 15 to 25 percent slopes, eroded
31B3	Edom silty clay loam, 2 to 7 percent slopes, severely eroded
31C3	Edom silty clay loam, 7 to 15 percent slopes, severely eroded
32C2	Edom-Rock outcrop complex, 0 to 15 percent slopes, eroded
32E2	Edom-Rock outcrop complex, 15 to 45 percent slopes, eroded

SYMBOL	NAME
33E	Elliber very cherty silt loam, 15 to 45 percent slopes
34F	Elliber and Jefferson very cherty soils, 45 to 70 percent slopes
35B2	Endcav silt loam, 2 to 7 percent slopes, eroded
35C2	Endcav silt loam, 7 to 15 percent slopes, eroded
36B2	Endcav silt loam, rocky, 2 to 7 percent slopes, eroded
37C2	Endcav-Rock outcrop complex, 2 to 15 percent slopes, eroded
38B	Ernest silt loam, 0 to 7 percent slopes
38C	Ernest silt loam, 7 to 15 percent slopes
39	Fluvaquents, nearly level *
40B2	Frederick-Christian silt loams, 2 to 7 percent slopes, eroded
40C2	Frederick-Christian silt loams, 7 to 15 percent slopes, eroded
40D2	Frederick-Christian silt loams, 15 to 25 percent slopes, eroded
40E2	Frederick-Christian silt loams, 25 to 45 percent slopes, eroded
41B3	Frederick-Christian silty clay loams, 2 to 7 percent slopes, severely eroded
41C3	Frederick-Christian silty clay loams, 7 to 15 percent slopes, severely eroded
41D3	Frederick-Christian silty clay loams, 15 to 25 percent slopes, severely eroded
42B2	Frederick-Christian cherty silt loams, 2 to 7 percent slopes, eroded
42C2	Frederick-Christian cherty silt loams, 7 to 15 percent slopes, eroded
42D2	Frederick-Christian cherty silt loams, 15 to 25 percent slopes, eroded
42E2	Frederick-Christian cherty silt loams, 25 to 45 percent slopes, eroded
43C	Frederick-Christian very cherty silt loams, 7 to 15 percent slopes
43D	Frederick-Christian very cherty silt loams, 15 to 25 percent slopes
43E	Frederick-Christian very cherty silt loams, 25 to 45 percent slopes
44B2	Frederick-Christian silt loams, rocky, 2 to 7 percent slopes, eroded
44C2	Frederick-Christian silt loams, rocky, 7 to 15 percent slopes, eroded
44D2	Frederick-Christian silt loams, rocky, 15 to 25 percent slopes, eroded
44E2	Frederick-Christian silt loams, rocky, 25 to 45 percent slopes, eroded
45C2	Frederick-Rock outcrop complex, 0 to 15 percent slopes, eroded
45E2	Frederick-Rock outcrop complex, 15 to 45 percent slopes, eroded
46B	Frederick-Nixa complex, 2 to 7 percent slopes
46C	Frederick-Nixa complex, 7 to 15 percent slopes
47C	Guernsey silt loam, 2 to 10 percent slopes
48E	Hartleton channery loam, 15 to 45 percent slopes
49F	Hartleton soils, 25 to 75 percent slopes
50D	Hazleton stony fine sandy loam, 7 to 25 percent slopes
50E	Hazleton stony fine sandy loam, 25 to 45 percent slopes
51D	Hazleton soils, 7 to 25 percent slopes
51F	Hazleton soils, 25 to 70 percent slopes
52F	Hazleton-Lehew complex, 25 to 70 percent slopes
53C	Jefferson cobbly fine sandy loam, 7 to 15 percent slopes
53D	Jefferson cobbly fine sandy loam, 15 to 25 percent slopes
54C	Leetonia very stony loamy sand, 7 to 15 percent slopes
54E	Leetonia extremely stony loamy sand, 15 to 45 percent slopes
55D	Lehew fine sandy loam, 7 to 25 percent slopes
56D	Lehew fine sandy loam, rocky, 7 to 25 percent slopes
57E	Lehew flaggy fine sandy loam, 25 to 45 percent slopes
57F	Lehew flaggy fine sandy loam, 45 to 70 percent slopes
58D	Lew very stony silt loam, 7 to 25 percent slopes
59E	Lew bouldery silt loam, 10 to 45 percent slopes
59F	Lew bouldery silt loam, 45 to 70 percent slopes
60	Massanetta silt loam
61B	Millrock loamy fine sand, 0 to 4 percent slopes
62B	Monongahela fine sandy loam, 0 to 7 percent slopes
62C	Monongahela fine sandy loam, 7 to 15 percent slopes
63B	Monongahela cobbly fine sandy loam, 0 to 7 percent slopes
63C	Monongahela cobbly fine sandy loam, 7 to 15 percent slopes

SYMBOL	NAME
64C	Nixa very cherty silt loam, 2 to 15 percent slopes
64D	Nixa very cherty silt loam, 15 to 25 percent slopes
65E	Opequon-Rock outcrop complex, 7 to 45 percent slopes
66	Philo silt loam
66X	Pits and dumps
67	Purdy silt loam
68E	Rock outcrop-Chilhowie complex, steep
69F	Rock outcrop-Drall complex, steep
70C	Rock outcrop-Frederick complex, sloping
70E	Rock outcrop-Frederick complex, steep
71	Rubble land
72F	Rushtown shaly silt loam, 45 to 80 percent slopes
73B2	Sequoia silt loam, 2 to 7 percent slopes, eroded
73C2	Sequoia silt loam, 7 to 15 percent slopes, eroded
74B2	Sequoia-Berks silt loams, 2 to 7 percent slopes, eroded
74C2	Sequoia-Berks silt loams, 7 to 15 percent slopes, eroded
74D2	Sequoia-Berks silt loams, 15 to 25 percent slopes, eroded
75B2	Shenval loam, 2 to 7 percent slopes, eroded
75C2	Shenval loam, 7 to 15 percent slopes, eroded
75D2	Shenval loam, 15 to 25 percent slopes, eroded
76C	Shenval cobbly loam, 7 to 15 percent slopes
76D	Shenval cobbly loam, 15 to 25 percent slopes
77C	Sherando sandy loam, 2 to 15 percent slopes
77D	Sherando sandy loam, 15 to 25 percent slopes
78C	Sherando cobbly sandy loam, 2 to 15 percent slopes
78E	Sherando cobbly sandy loam, 15 to 45 percent slopes
79B	Timberville silt loam, 0 to 7 percent slopes
80B	Timberville cherty silt loam, 0 to 7 percent slopes
81	Tioga fine sandy loam
82	Udifluvents, loamy *
83	Udorthents, sandy *
84	Udorthents, shaly *
85	Udorthents, bouldery *
86B	Unison fine sandy loam, 2 to 7 percent slopes
86C2	Unison fine sandy loam, 7 to 15 percent slopes, eroded
86D2	Unison fine sandy loam, 15 to 25 percent slopes, eroded
87B	Unison cobbly fine sandy loam, 2 to 7 percent slopes
87C	Unison cobbly fine sandy loam, 7 to 15 percent slopes
87E	Unison cobbly fine sandy loam, 15 to 45 percent slopes
88	Urban land
89D3	Weikert very shaly silt loam, 7 to 25 percent slopes, severely eroded
89E3	Weikert very shaly silt loam, 25 to 45 percent slopes, severely eroded
89F3	Weikert very shaly silt loam, 45 to 80 percent slopes, severely eroded
90D2	Weikert-Berks shaly silt loams, 15 to 25 percent slopes, eroded
90E3	Weikert-Berks shaly silt loams, 25 to 50 percent slopes, severely eroded
91B	Wheeling silt loam, 0 to 7 percent slopes
91C2	Wheeling silt loam, 7 to 15 percent slopes, eroded
92B	Wheeling gravelly loam, 2 to 7 percent slopes
92C2	Wheeling gravelly loam, 7 to 15 percent slopes, eroded

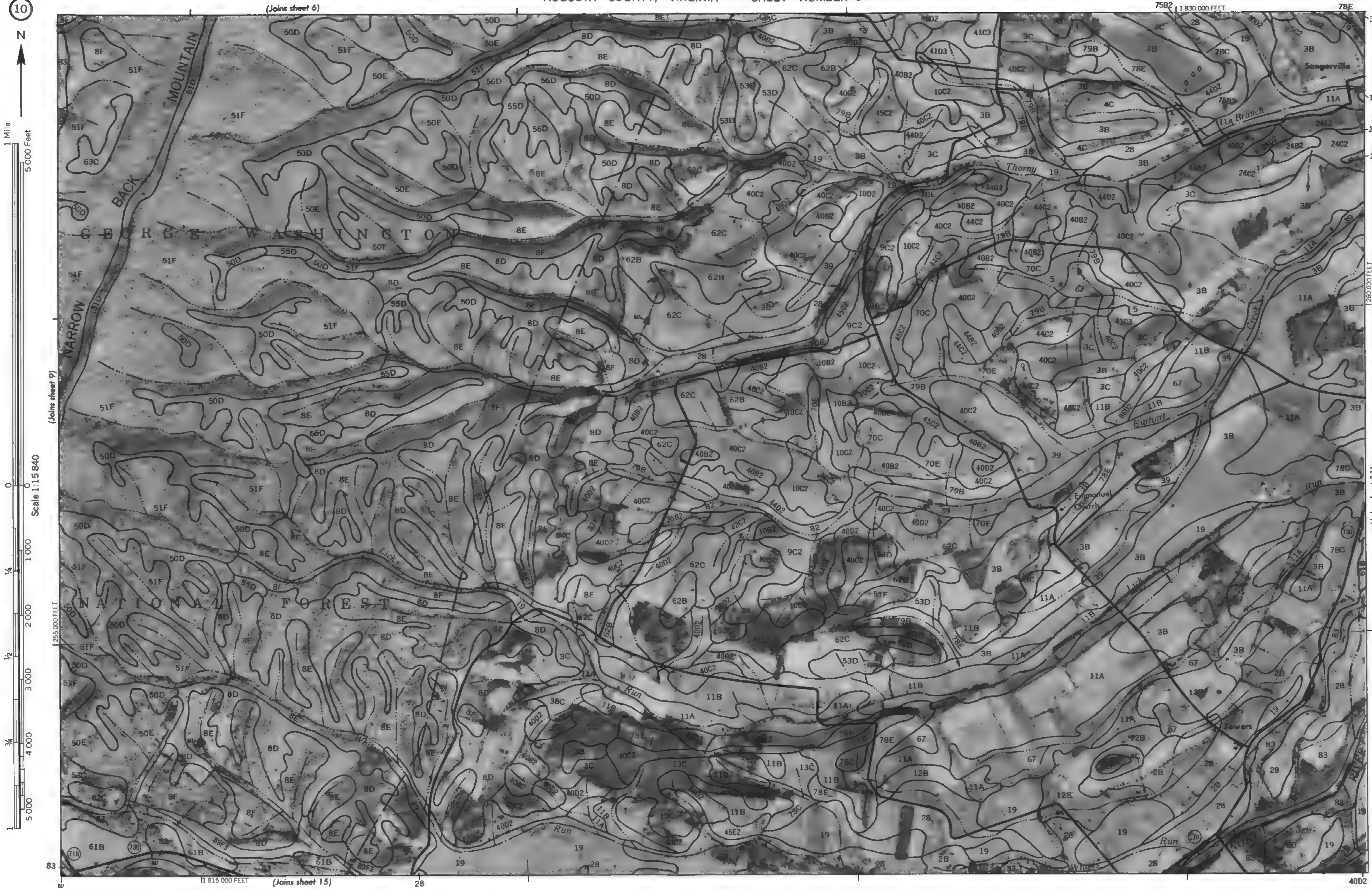
* The composition of these units is more variable than others in the survey area, but has been controlled well enough to be interpreted for the expected uses of the soil.



AUGUSTA COUNTY, VIRGINIA NO. 1

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 10



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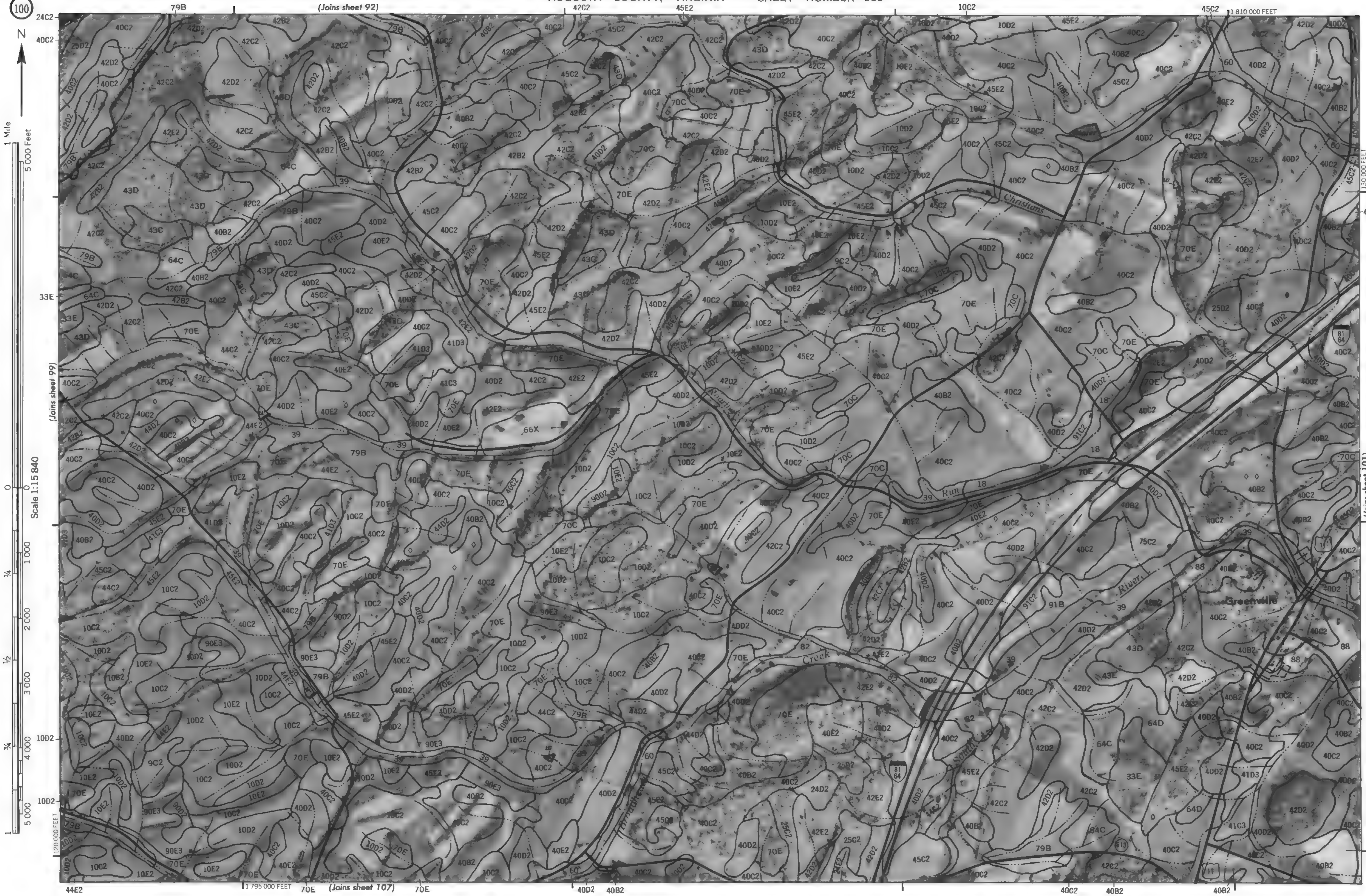
AUGUSTA COUNTY, VIRGINIA NO. 10



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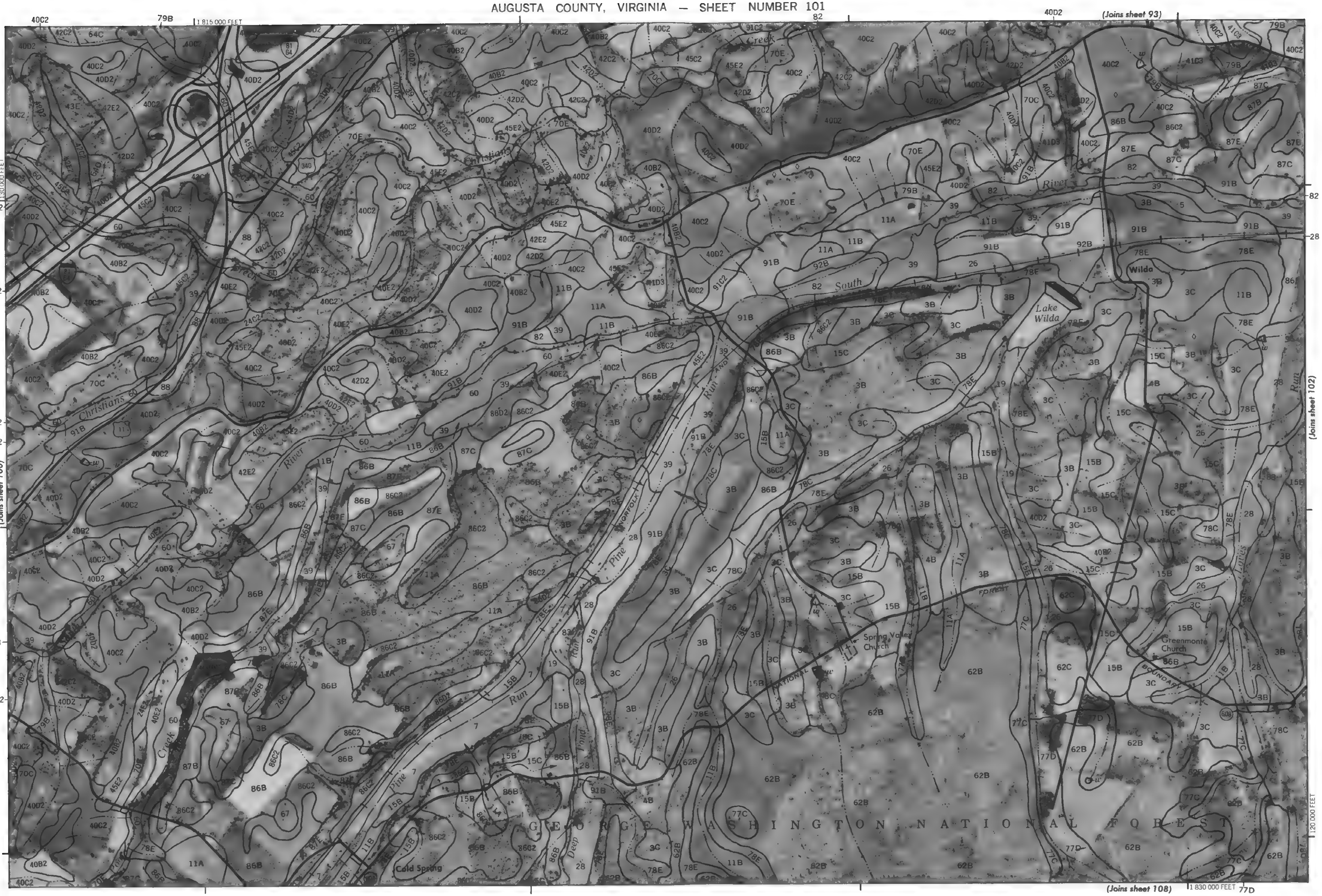
AUGUSTA COUNTY, VIRGINIA NO. 100

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 101



AUGUSTA COUNTY, VIRGINIA NO. 101

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AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 103

AUGUSTA COUNTY, VIRGINIA NO. 103

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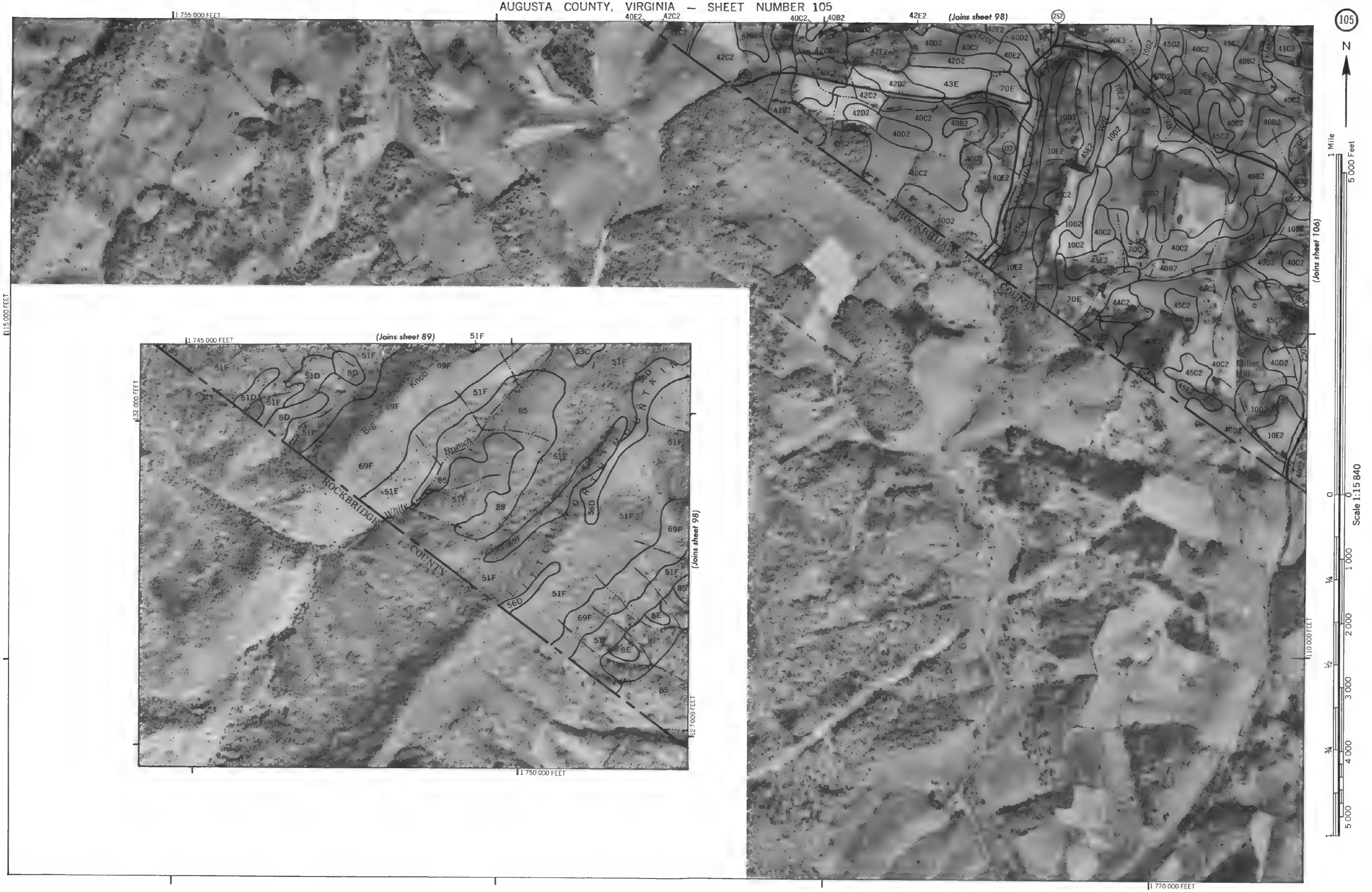
AUGUSTA COUNTY, VIRGINIA NO. 104



AUGUSTA COUNTY, VIRGINIA NO. 105

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperatin[illegible]encies
Coordinate grid ticks and land division [illegible]s, if shown, [illegible]ximately positioned

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 106

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AUGUSTA COUNTY, VIRGINIA NO. 106

AUGUSTA COUNTY, VIRGINIA NO. 107

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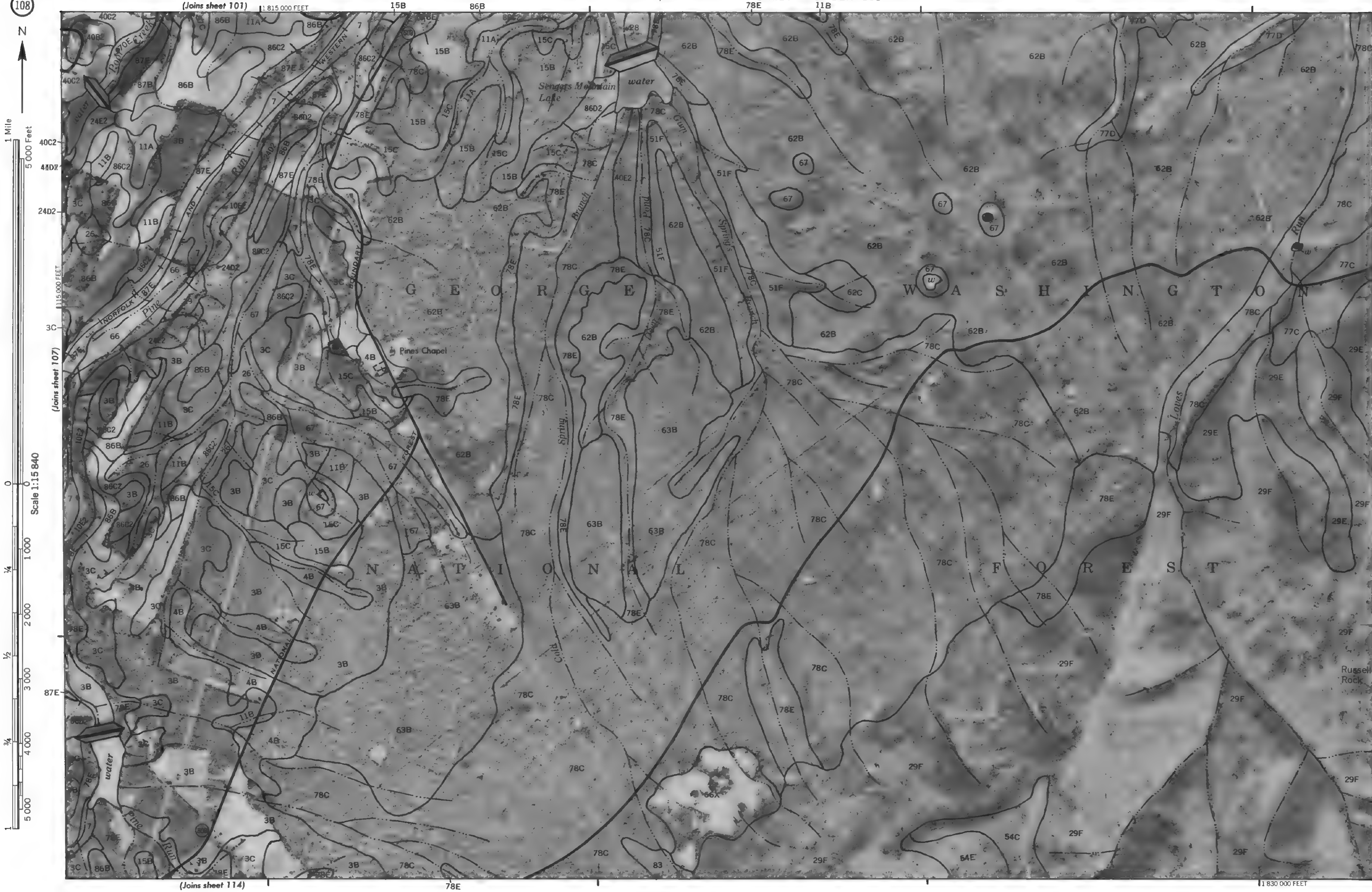
AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 108



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AUGUSTA COUNTY, VIRGINIA NO. 108

(109)

N

Scale 1:15 840

1 Mile | 5 000 Feet | 0 | 1/4 | 1/2 | 3/4 | 1 | 1 000 | 2 000 | 3 000 | 4 000 | 5 000

AUGUSTA COUNTY, VIRGINIA NO. 109

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AUGUSTA COUNTY, VIRGINIA NO. 11

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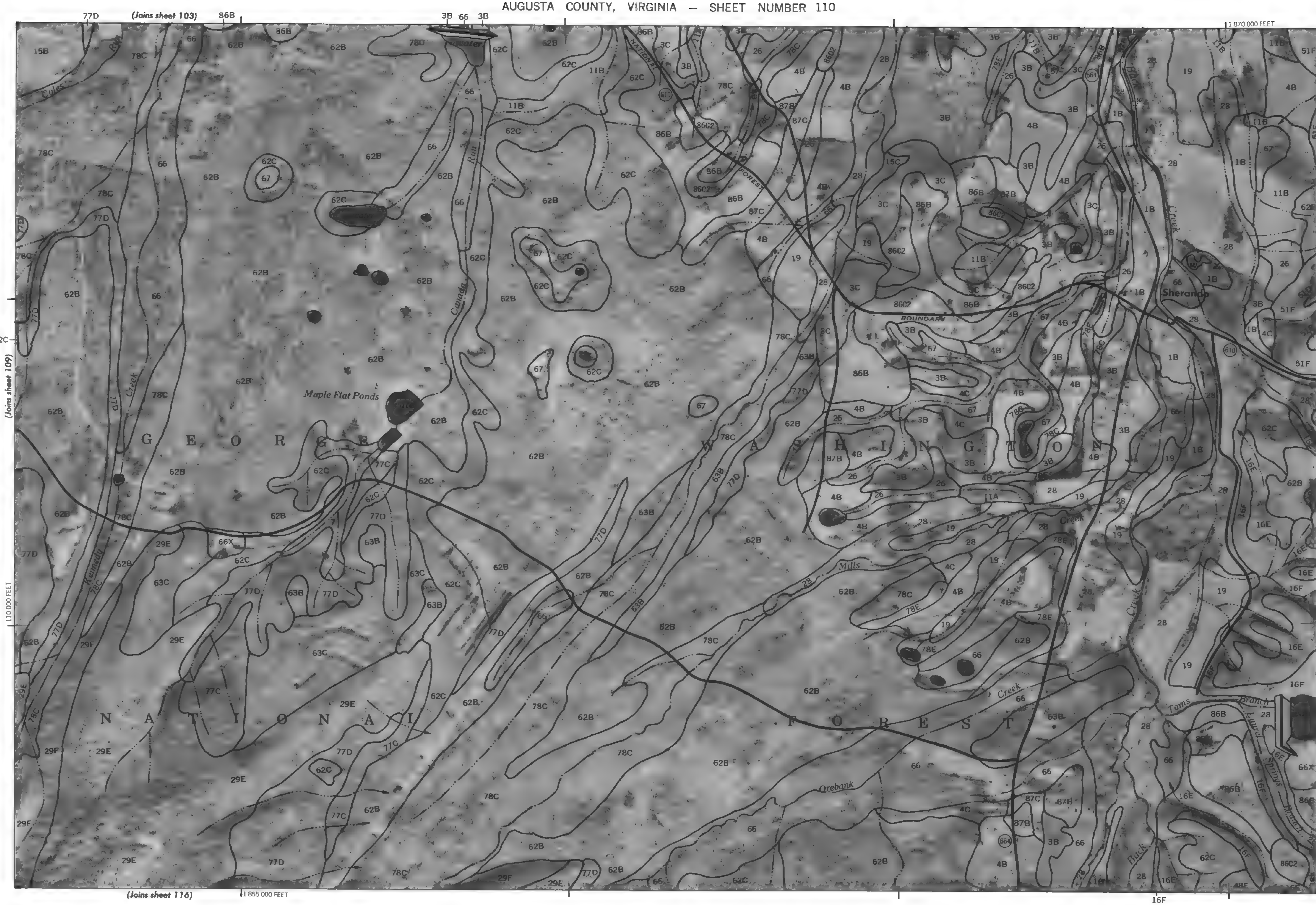
AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 110



N

1 Mile

5 000 Feet

Scale 1:15 840

0 ¼ ½ ¾ 1

0 1000 2000 3000 4000 5000

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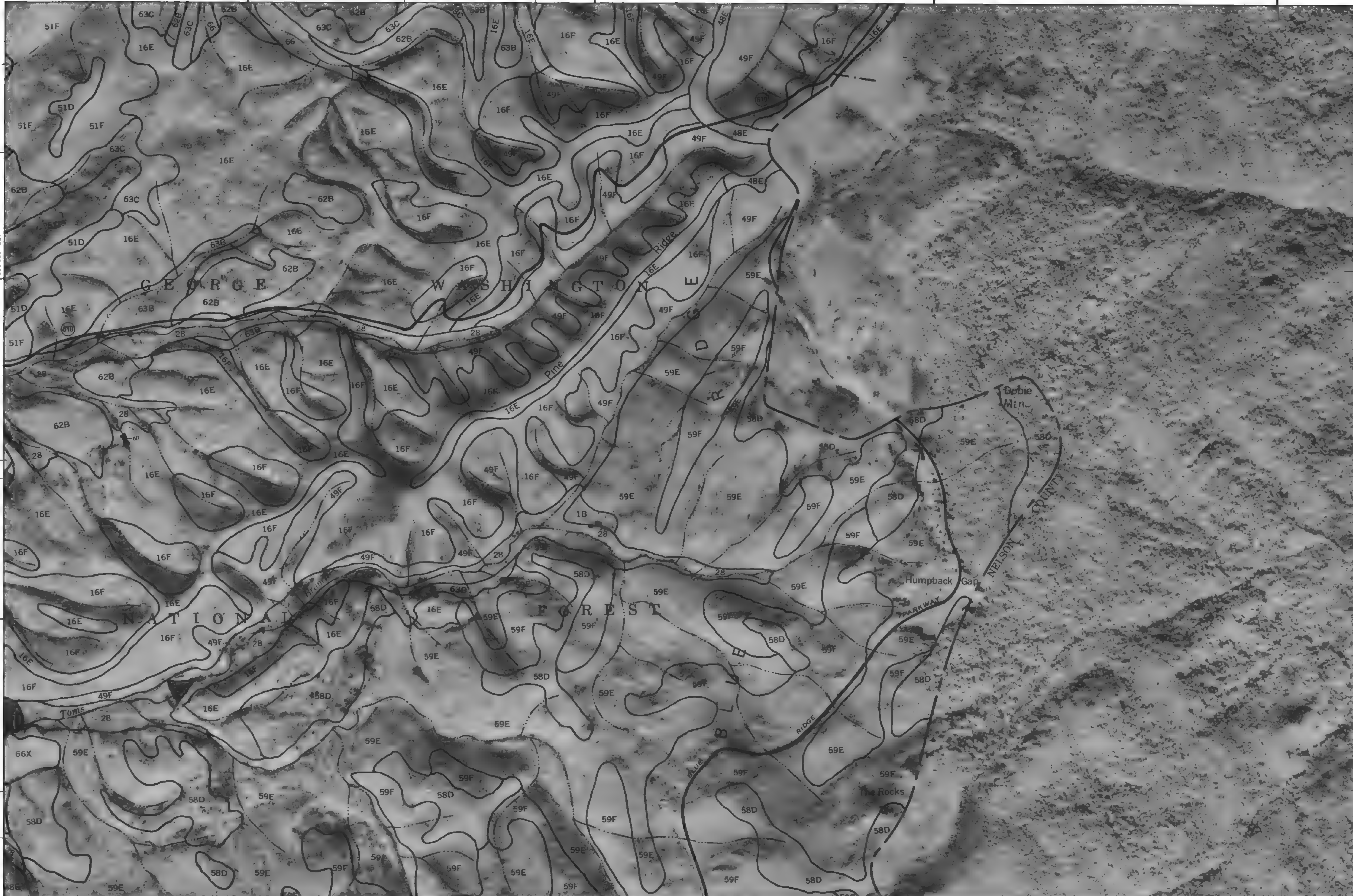
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA NO. 110

(111)

(Joins sheet 104)



(Joins sheet 110)

(Joins inset, sheet 112)

N

Scale 1:15 840

1 Mile

5 000 Feet

AUGUSTA COUNTY, VIRGINIA NO. 111

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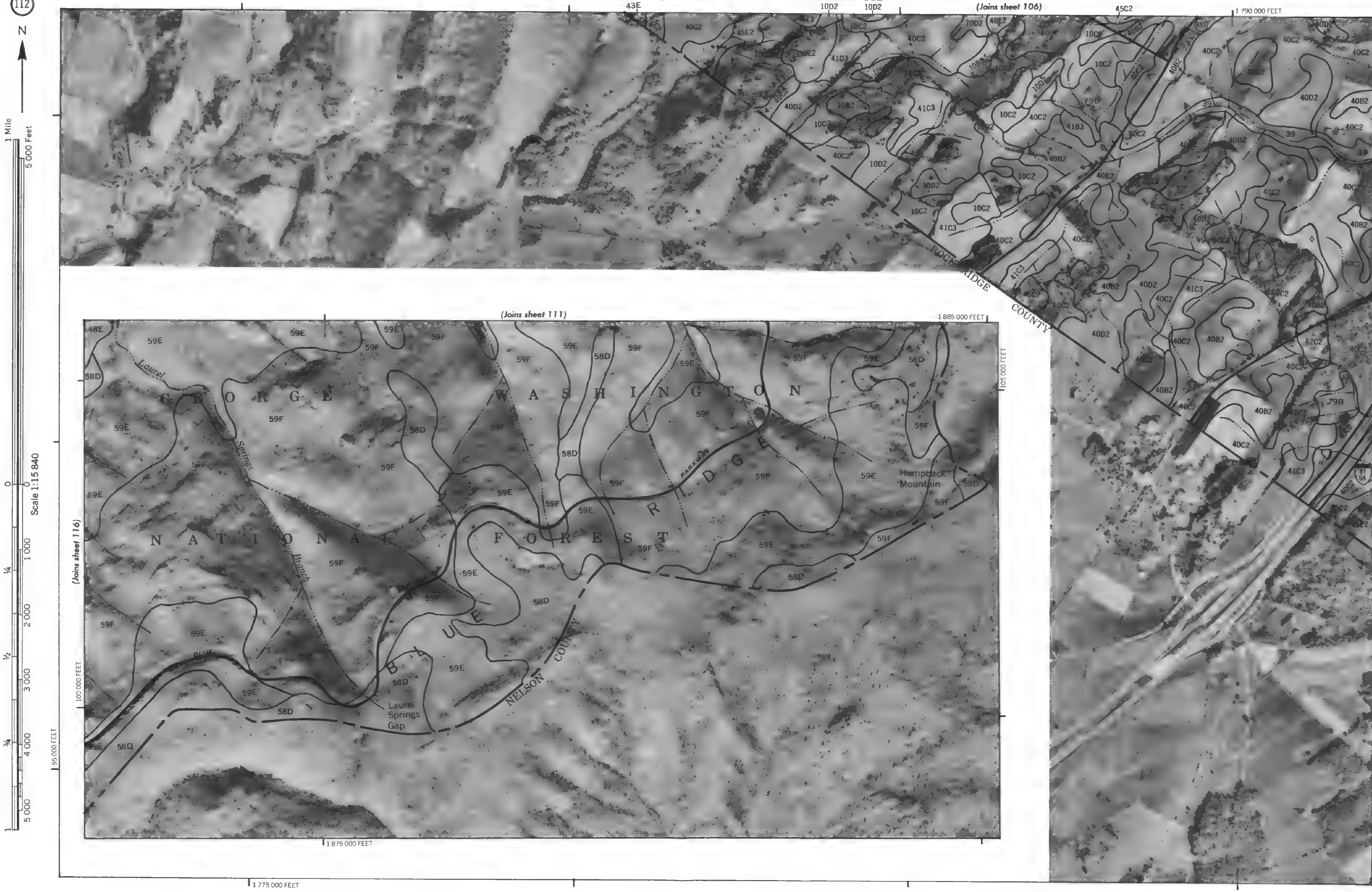
AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 112



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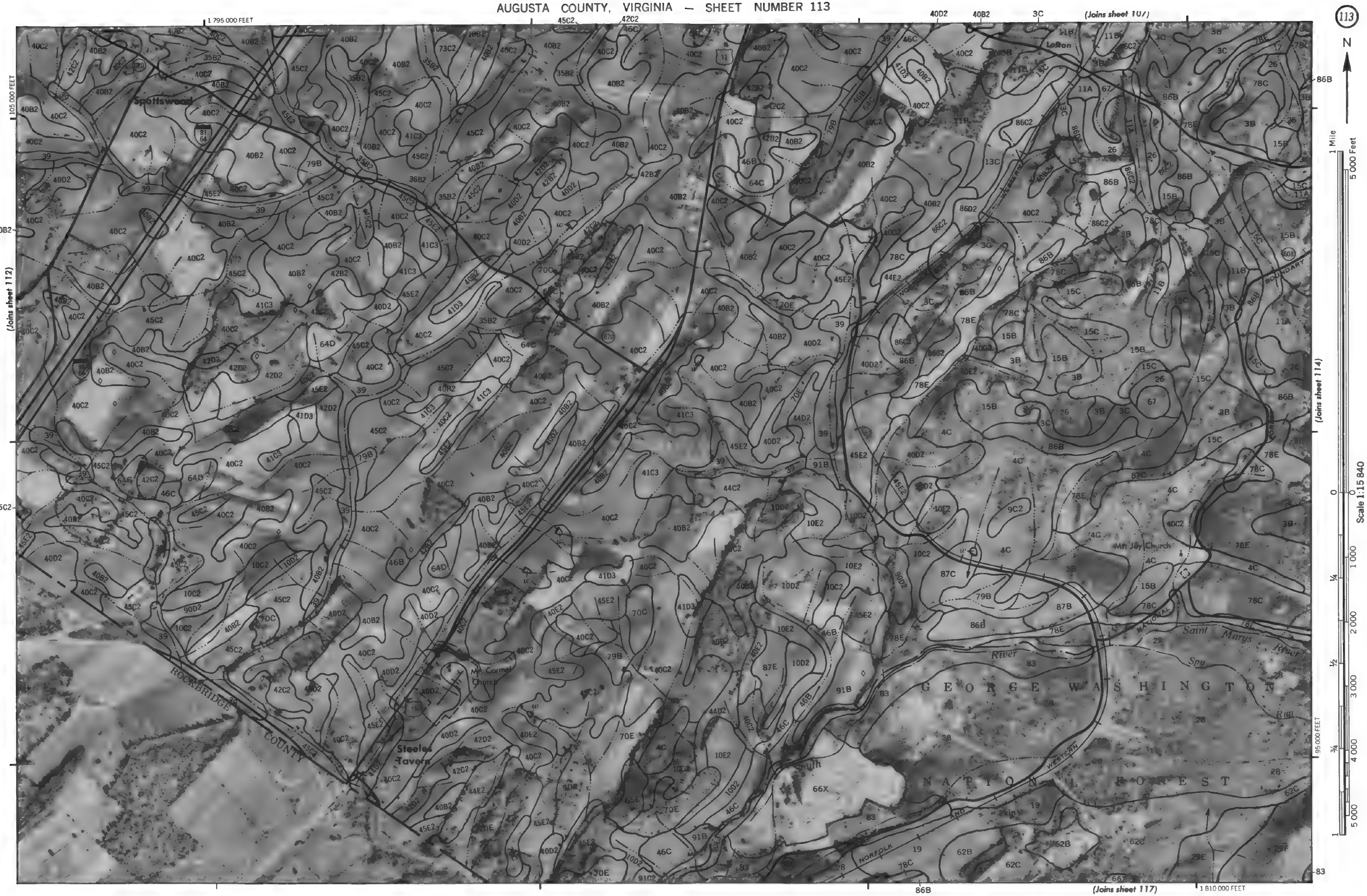

AUGUSTA COUNTY, VIRGINIA NO. 113

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AUGUSTA COUNTY, VIRGINIA NO. 114

AUGUSTA COUNTY, VIRGINIA NO. 115

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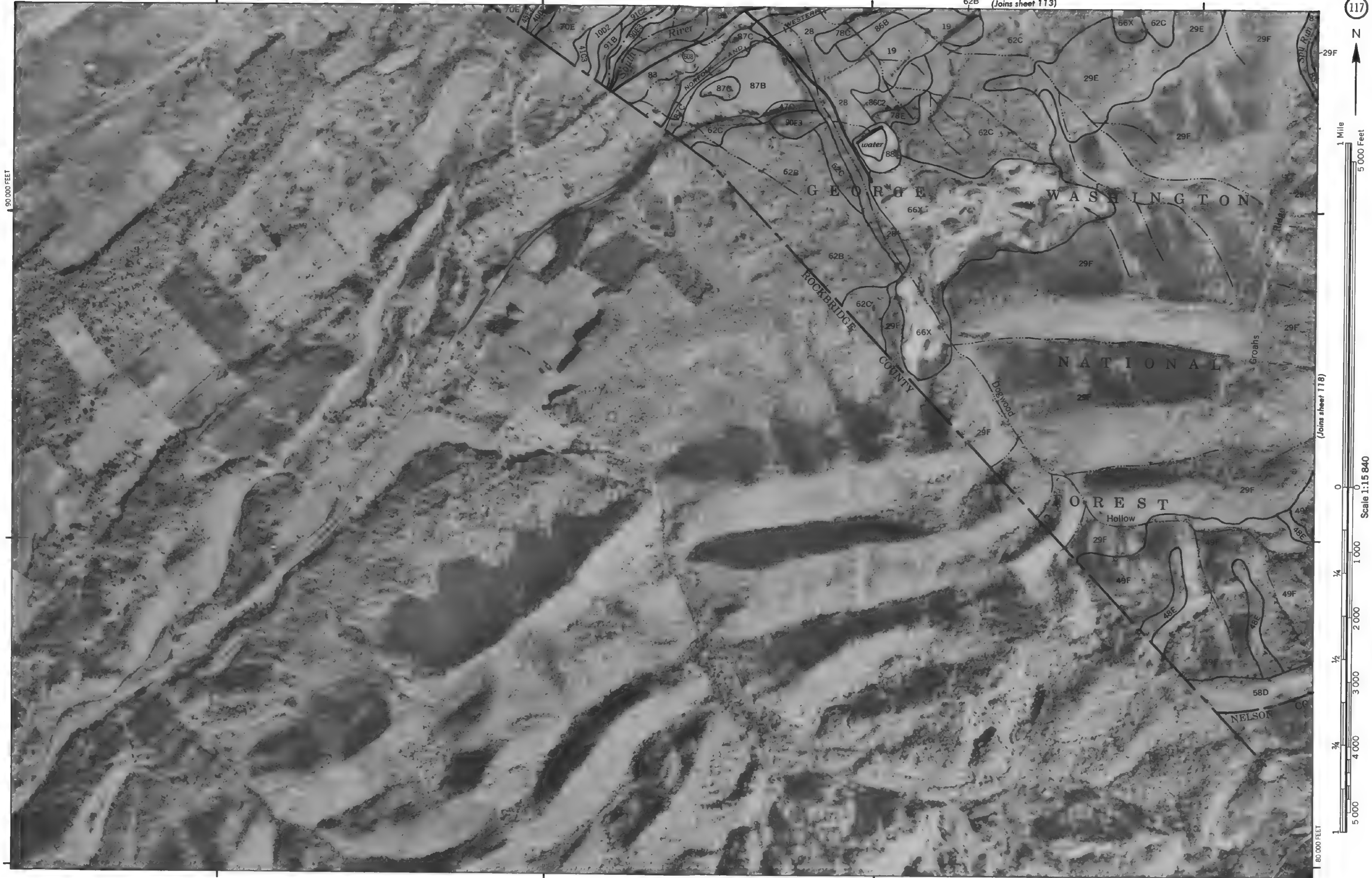
Coordinate grid ticks and land division corners, if shown, are approximately positioned



AUGUSTA COUNTY, VIRGINIA NO. 117

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(118)

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

119

N

1 Mile
5 000 Feet
Scale 1:15 840
0 ¼ ½ ¾ 1
0 1000 2000 3000 4000 5000

AUGUSTA COUNTY, VIRGINIA NO. 119

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.


12
N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 7)
(Joins sheet 19)
(Joins inset, sheet 18)
(Joins sheet 13)
1 770 000 FEET
1 755 000 FEET
250 000 FEET
240 000 FEET
HIGHLAND COUNTY
SHENANDOAH MOUNTAIN
GEORGE WASHINGTON NATIONAL FOREST
Freezland Flat
Gordons Peak
The Pinnacle
Dividing Ridge
BALD RIDGE
Littlefield Ridge
Ramseys Draft
Rattlesnake Run
AUGUSTA COUNTY, VIRGINIA NO. 12

1000 AND 3000-FOOT GRID TICKS

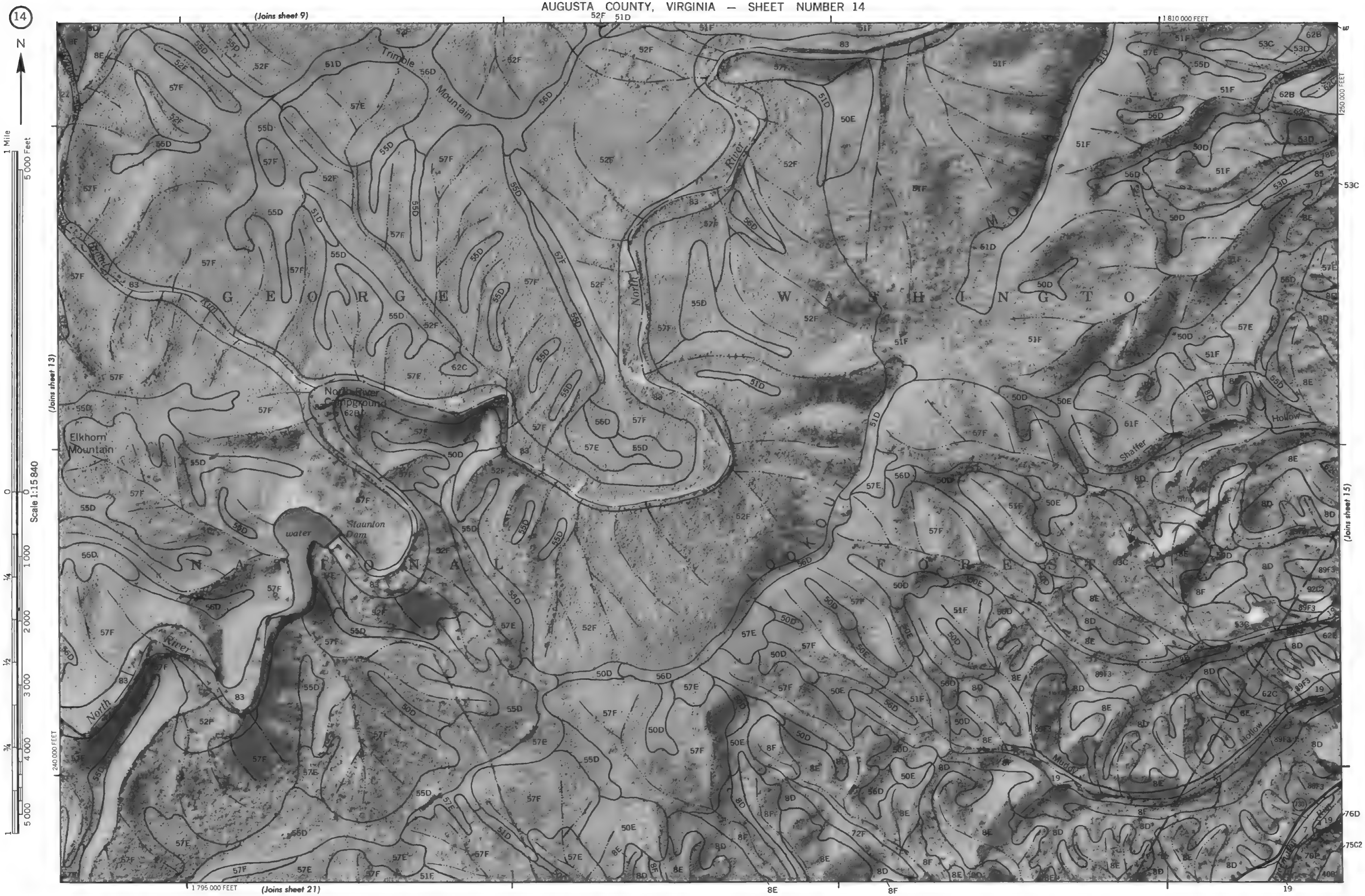
This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners, if shown, are approximately positioned

AUGUSTA COUNTY, VIRGINIA NO. 120

AUGUSTA COUNTY, VIRGINIA NO. 13

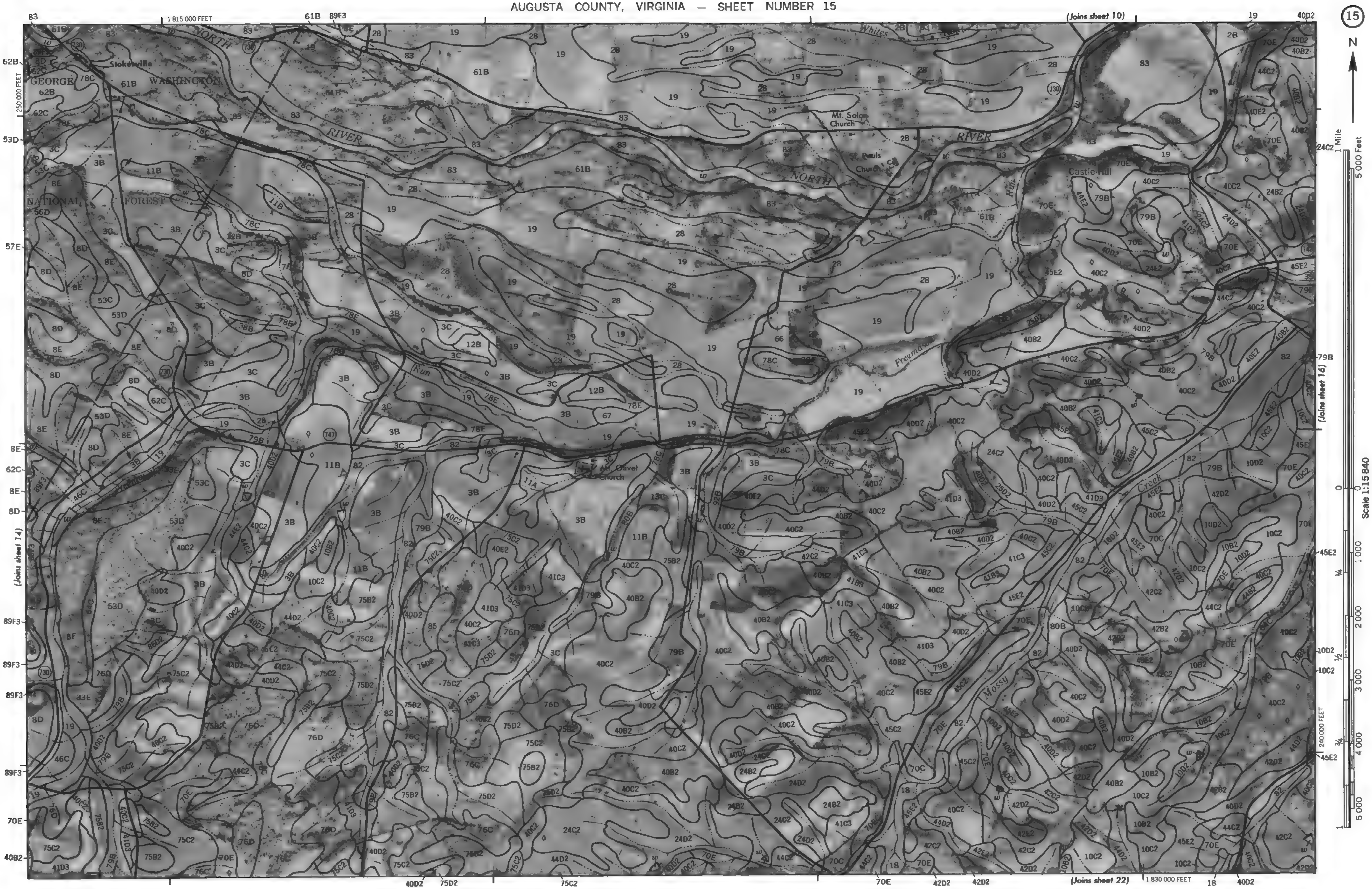
This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 14



This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned

AUGUSTA COUNTY, VIRGINIA NO. 14



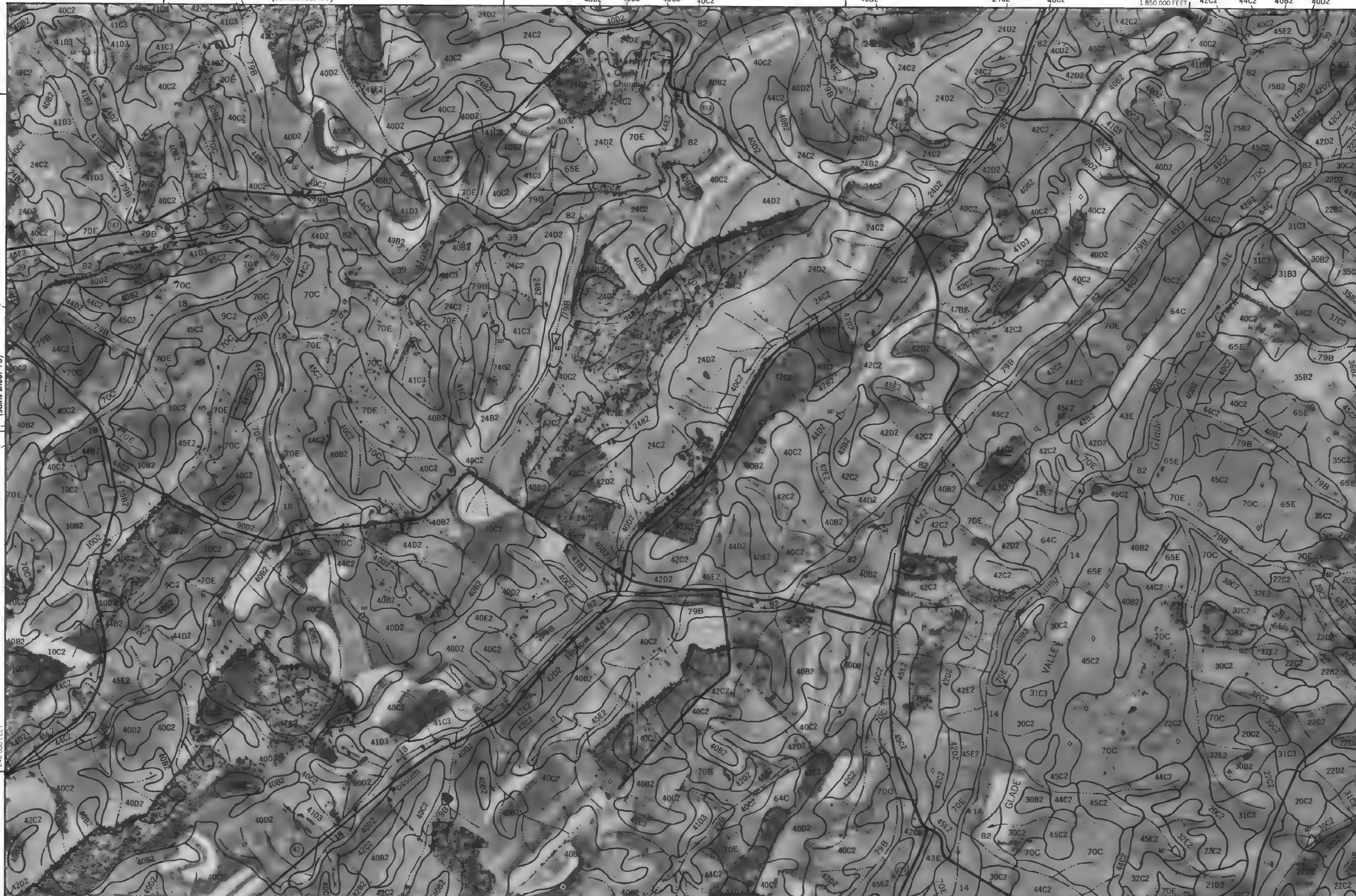
AUGUSTA COUNTY, VIRGINIA NO. 15

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

16

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 16

(Joins sheet 11)



N

Scale 1:15 840

1 Mile

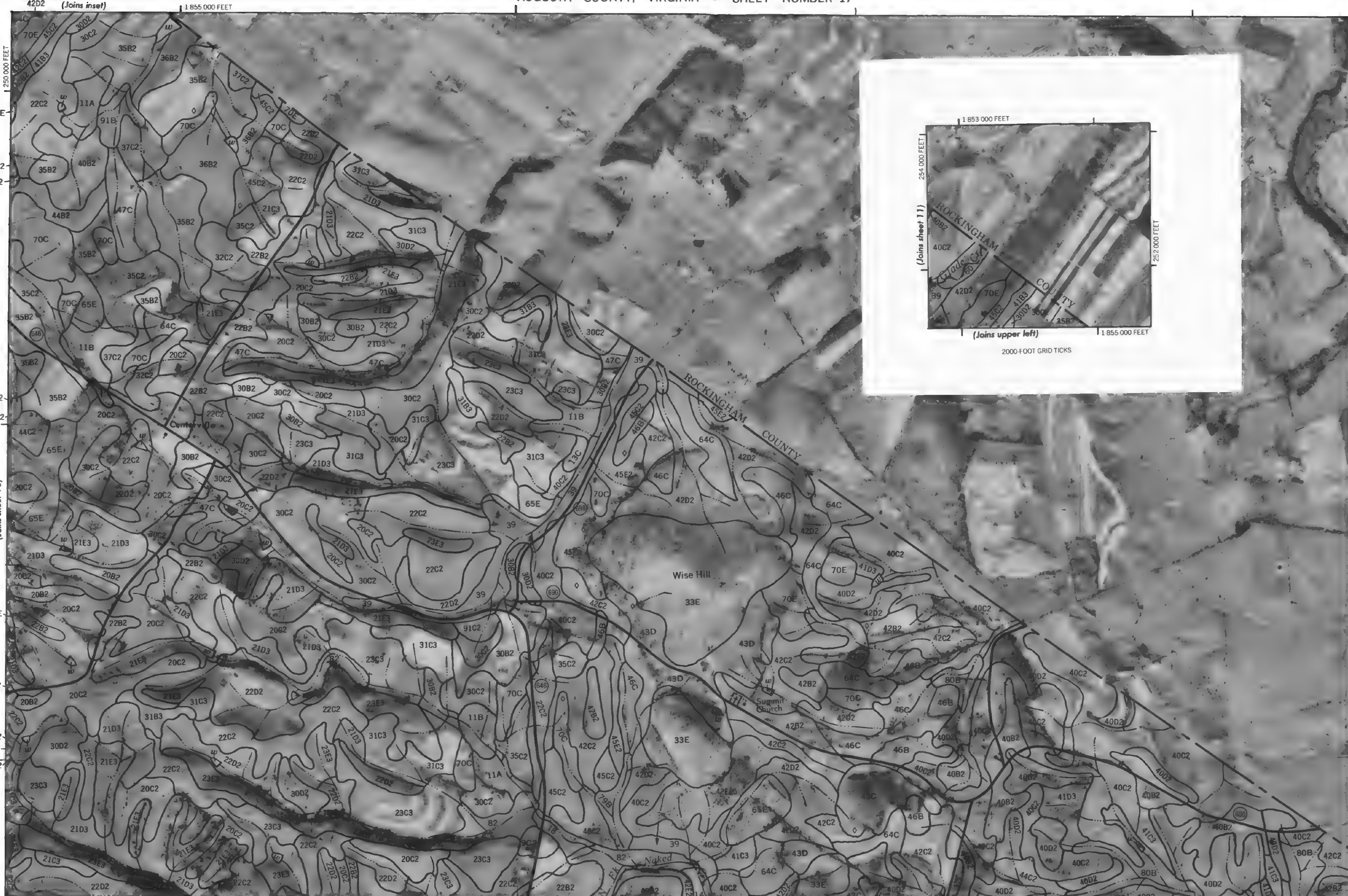
5 000 Feet

0 1/4 1/2 3/4 1

0 1 000 2 000 3 000 4 000 5 000

This map is compiled on 1957 and 1966 aerial photography by U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

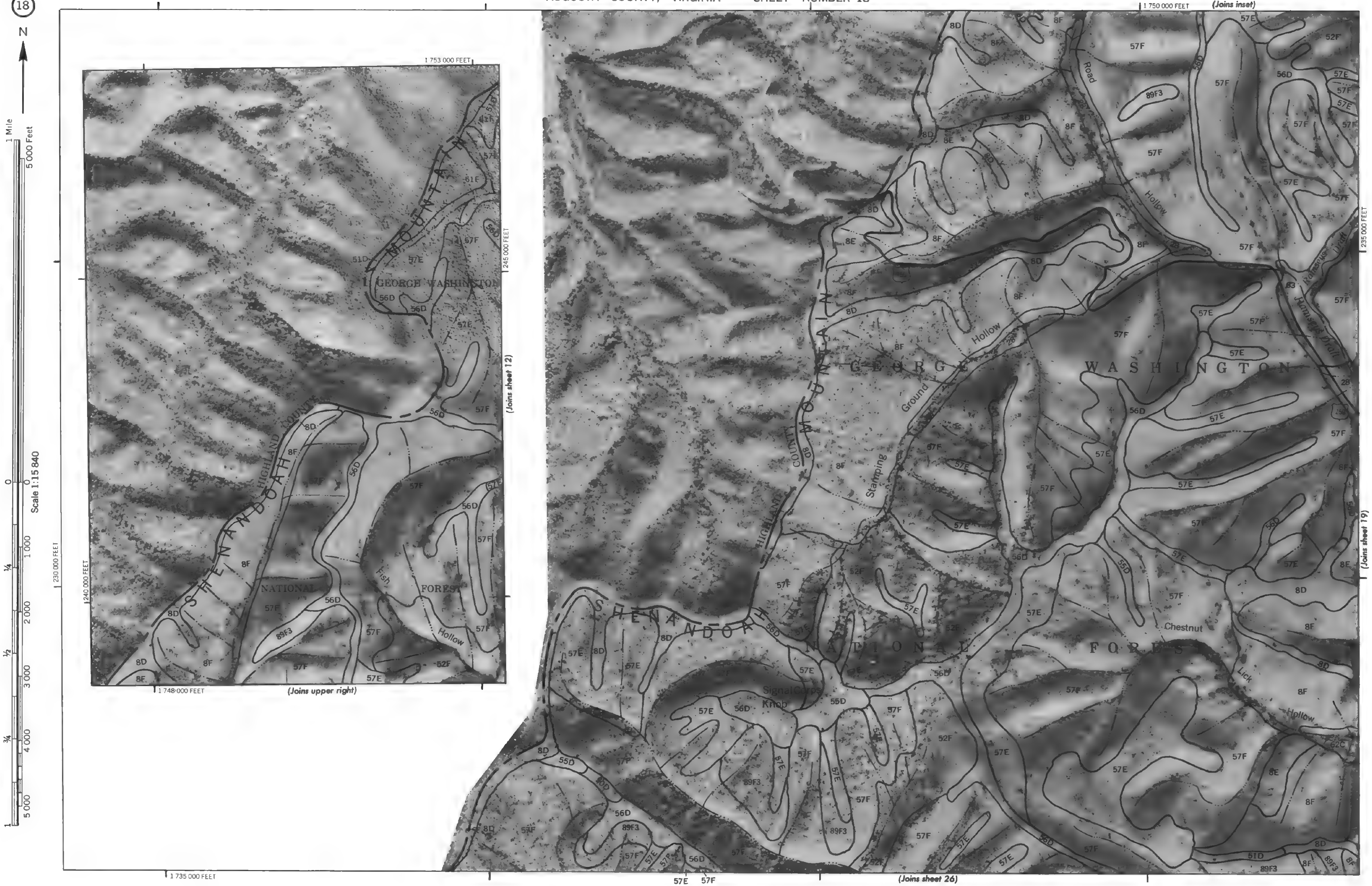
AUGUSTA COUNTY, VIRGINIA NO. 16



AUGUSTA COUNTY, VIRGINIA NO. 17

This map is compiled on 1957 and 1956 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 18



AUGUSTA COUNTY, VIRGINIA NO. 18

AUGUSTA COUNTY, VIRGINIA NO. 19

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA NO. 2

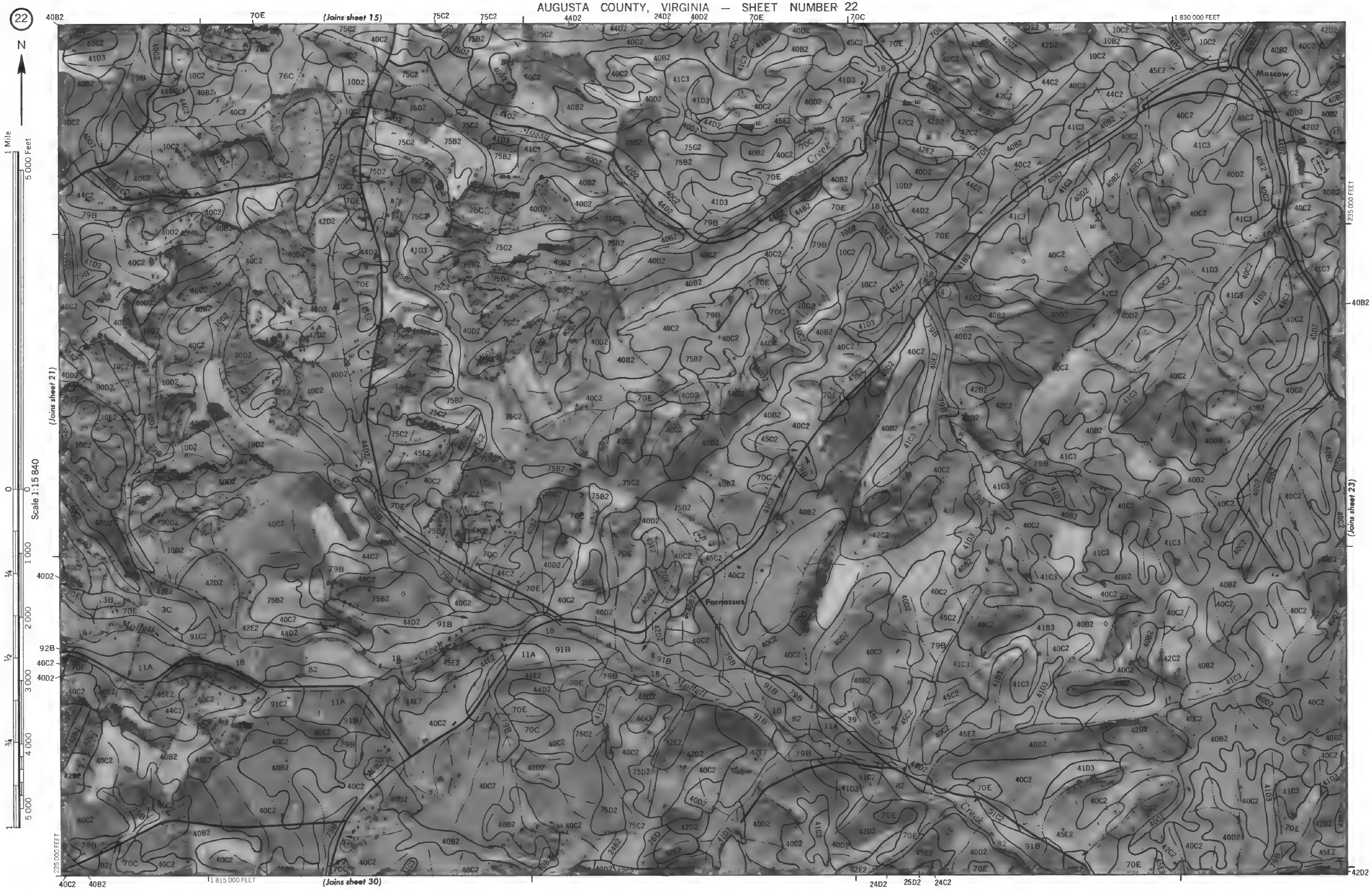
AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 20

This map is compiled on 1957 and 1956 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA NO. 20

AUGUSTA COUNTY, VIRGINIA NO. 21

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1957 and 1956 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA NO. 22

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 23

AUGUSTA COUNTY, VIRGINIA NO. 23

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 24

(Joins sheet 17)

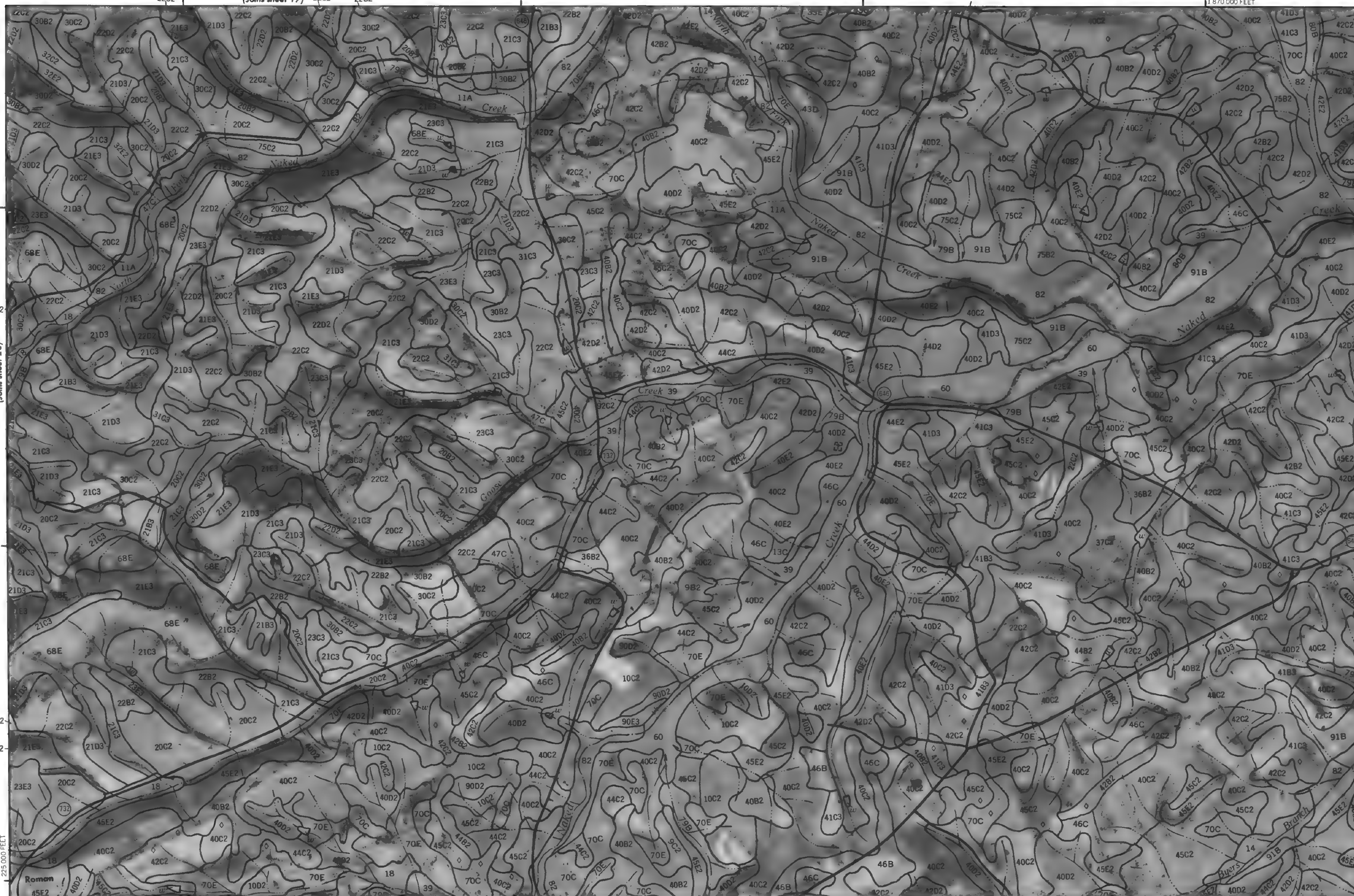
N

1 Mile

5 000 Feet

Scale 1:15 840

(Joins sheet 23)



(Joins sheet 25)

(Joins sheet 32)

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(25)

AUGUSTA COUNTY, VIRGINIA NO. 25

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

Scale 1:15 840

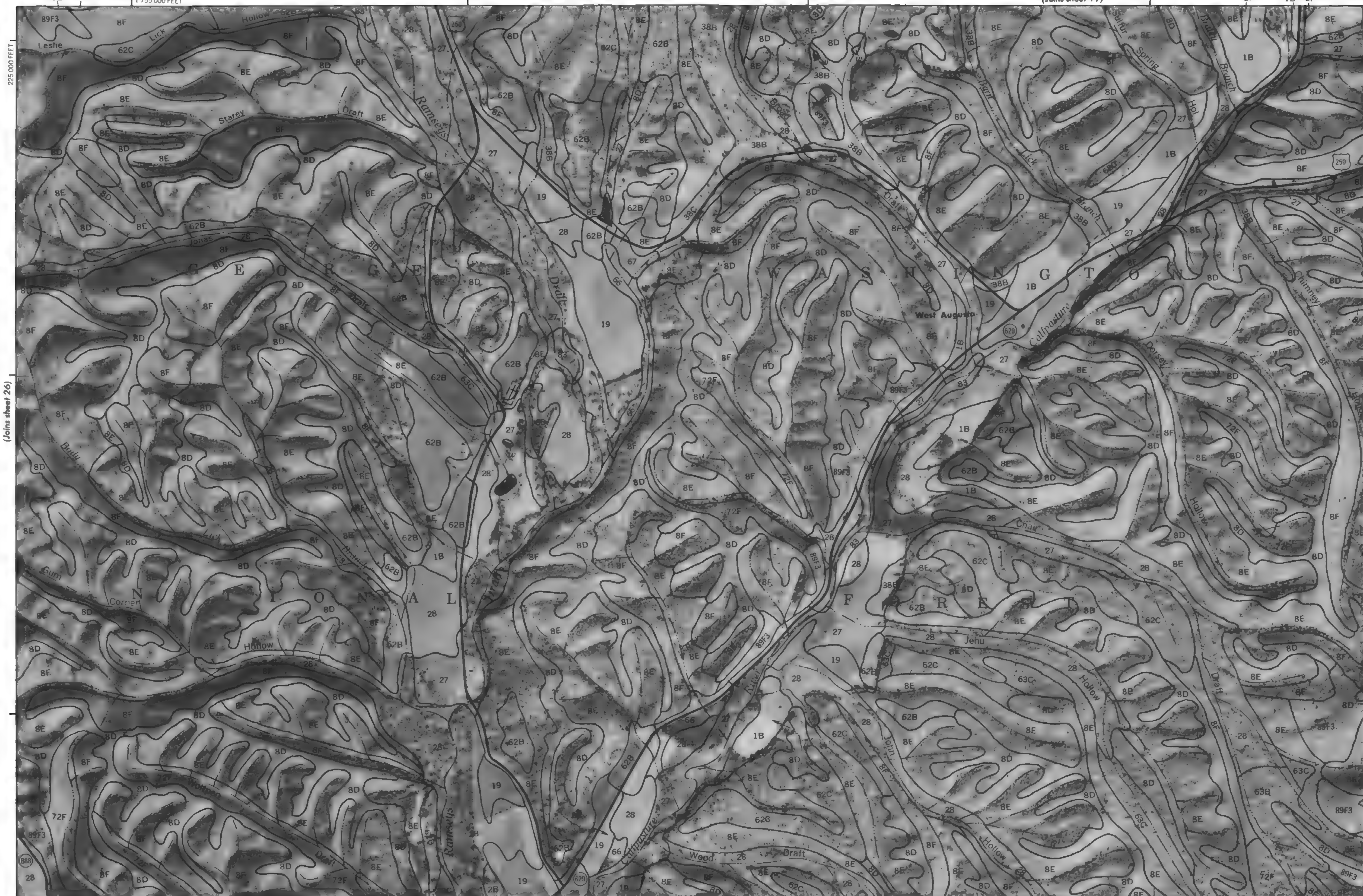
1 Mile

5 000 Feet

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 26

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA NO. 26



N

Scale 1:15 840

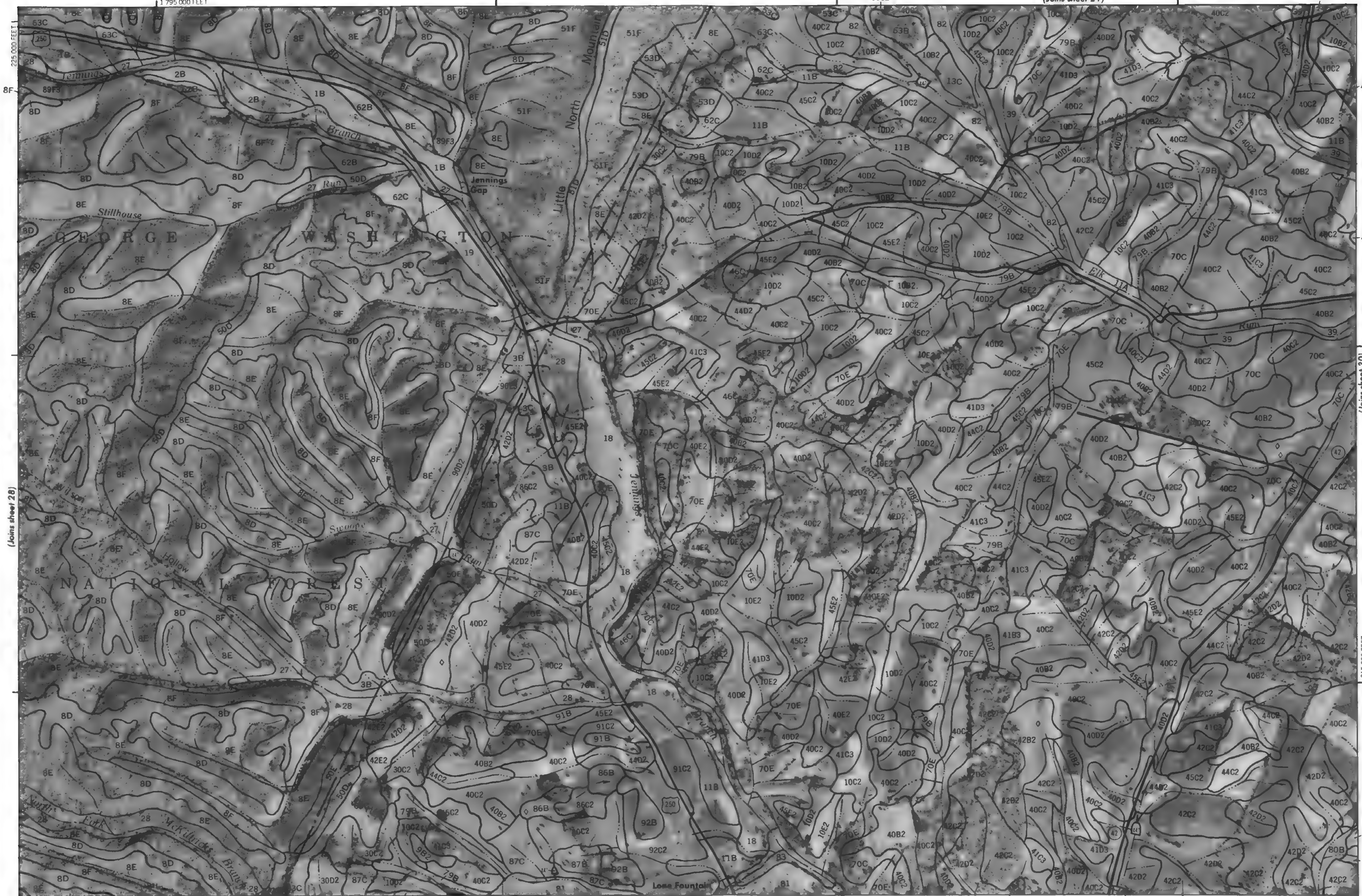
1 Mile

5 000 Feet

AUGUSTA COUNTY, VIRGINIA NO. 27

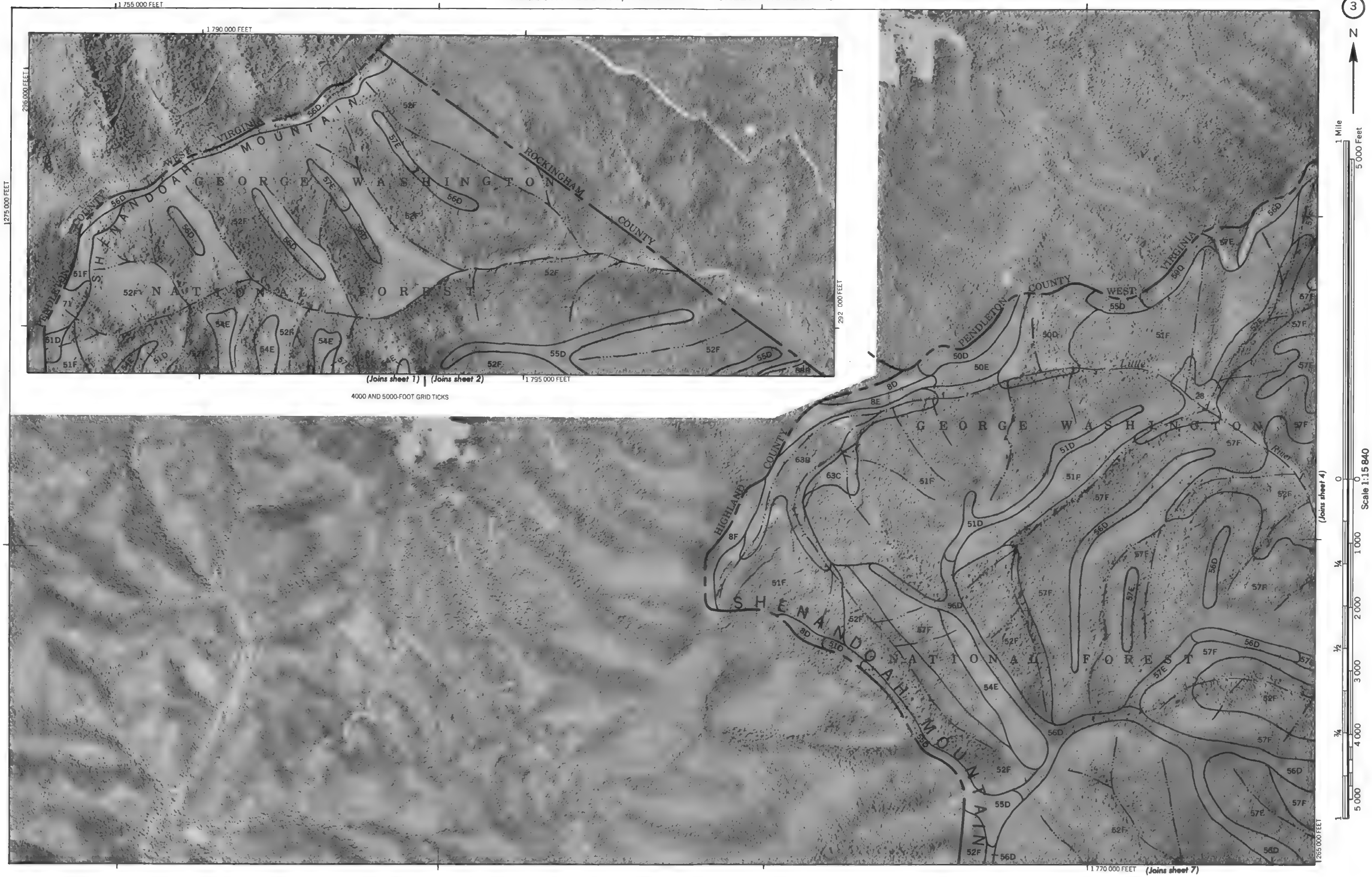
This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.


28
N
Scale 1:15 840
1 Mile
5 000 Feet
(Joins sheet 20)
(Joins sheet 27)
(Joins sheet 29)
(Joins sheet 38)
1 790 000 FEET
225 000 FEET
215 000 FEET
1 775 000 FEET
G E O R G E
W A S H I N G T O N
N A T I O N A L
F O R E S T
M O U N T A I N
C R A W F O R D
Branch
Jennings Branch
Lick Branch
Spruce
Sixmile Run
Coal Pit Knob
Wilson Hollow
North Fork McKittricks
McKittricks Ridge
Chimney
This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



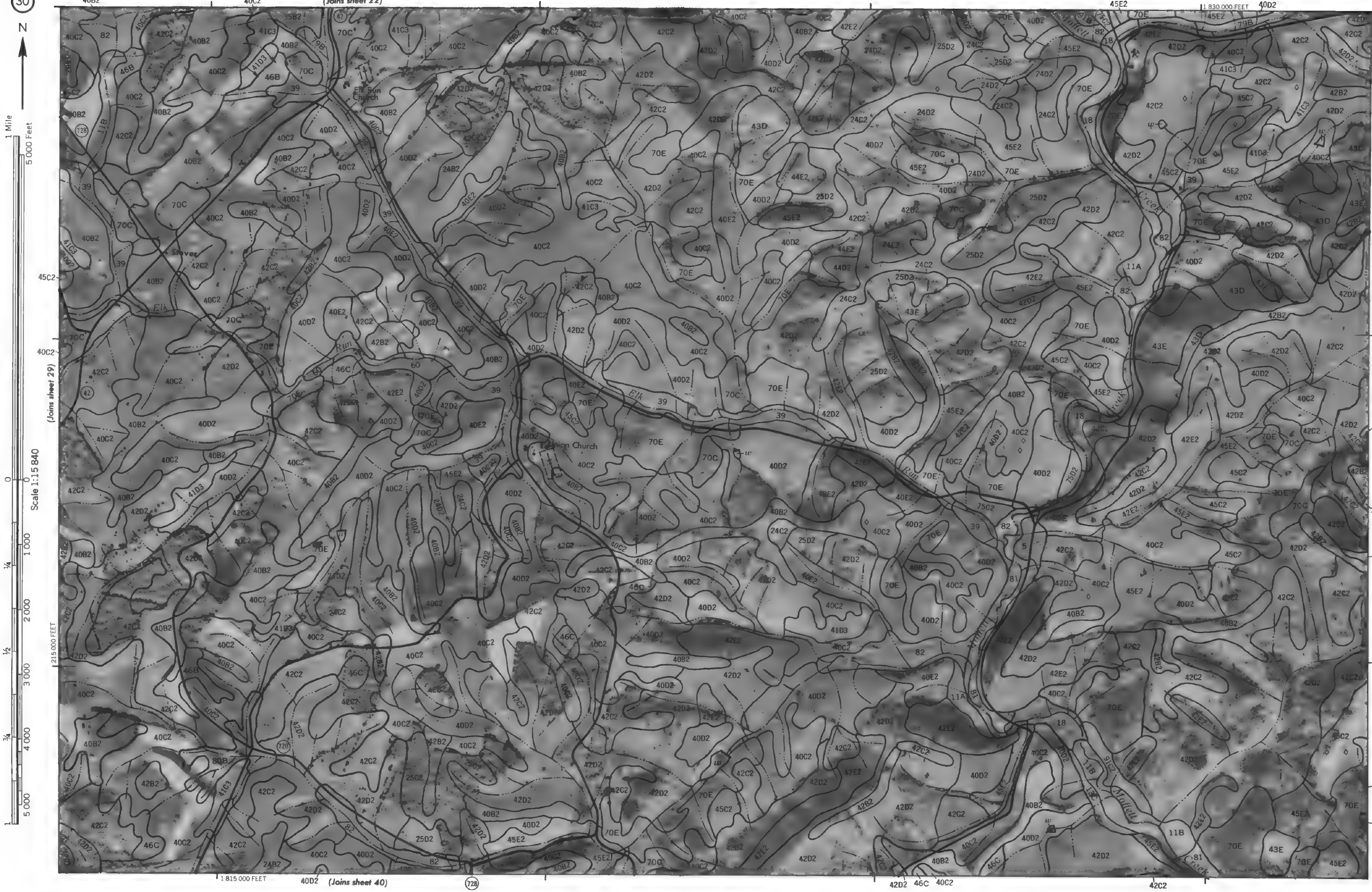
AUGUSTA COUNTY, VIRGINIA NO. 29

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



AUGUSTA COUNTY, VIRGINIA NO. 3

This map is compiled on 1957 and 1960 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

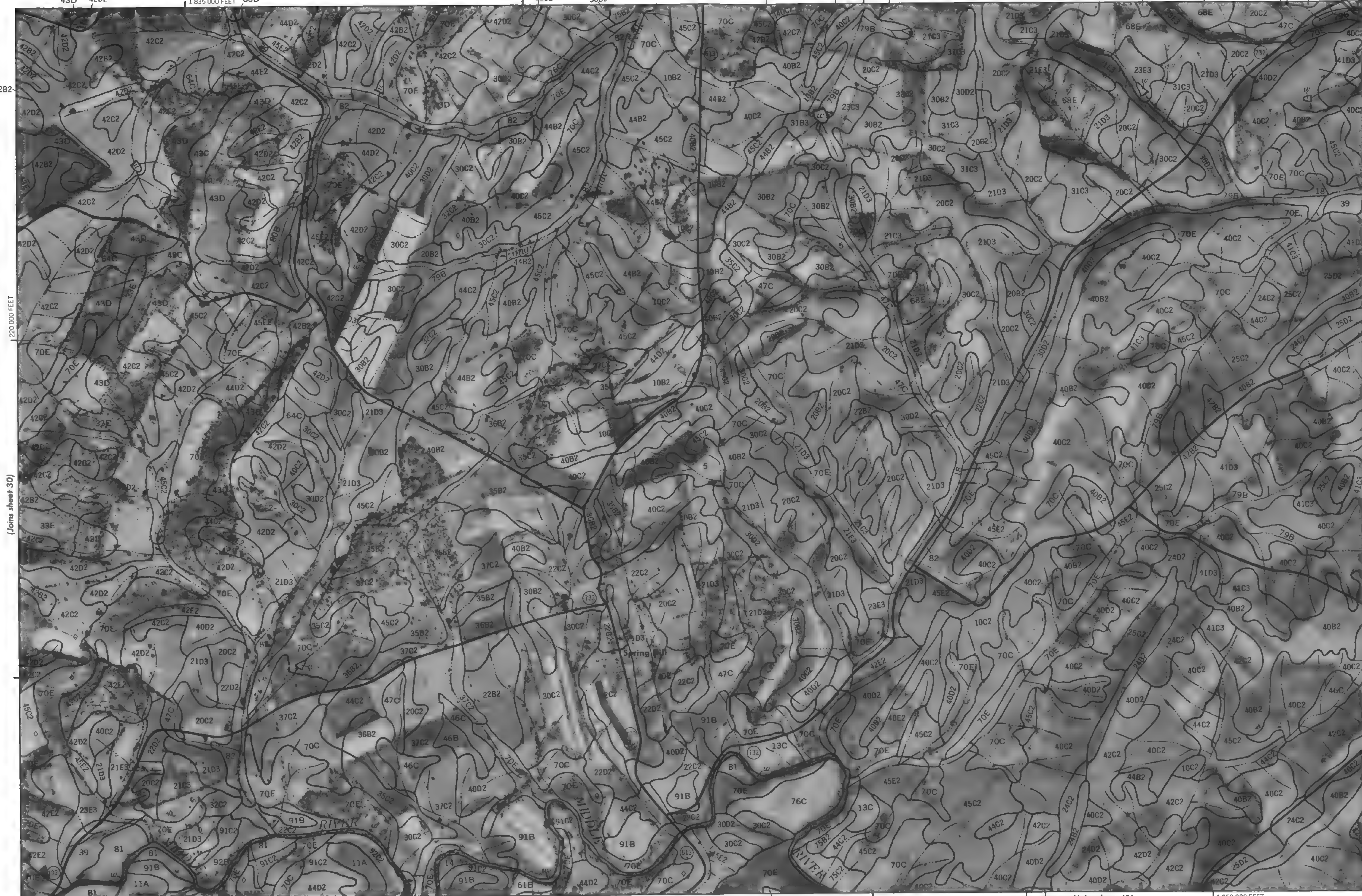


This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA NO. 30

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 31

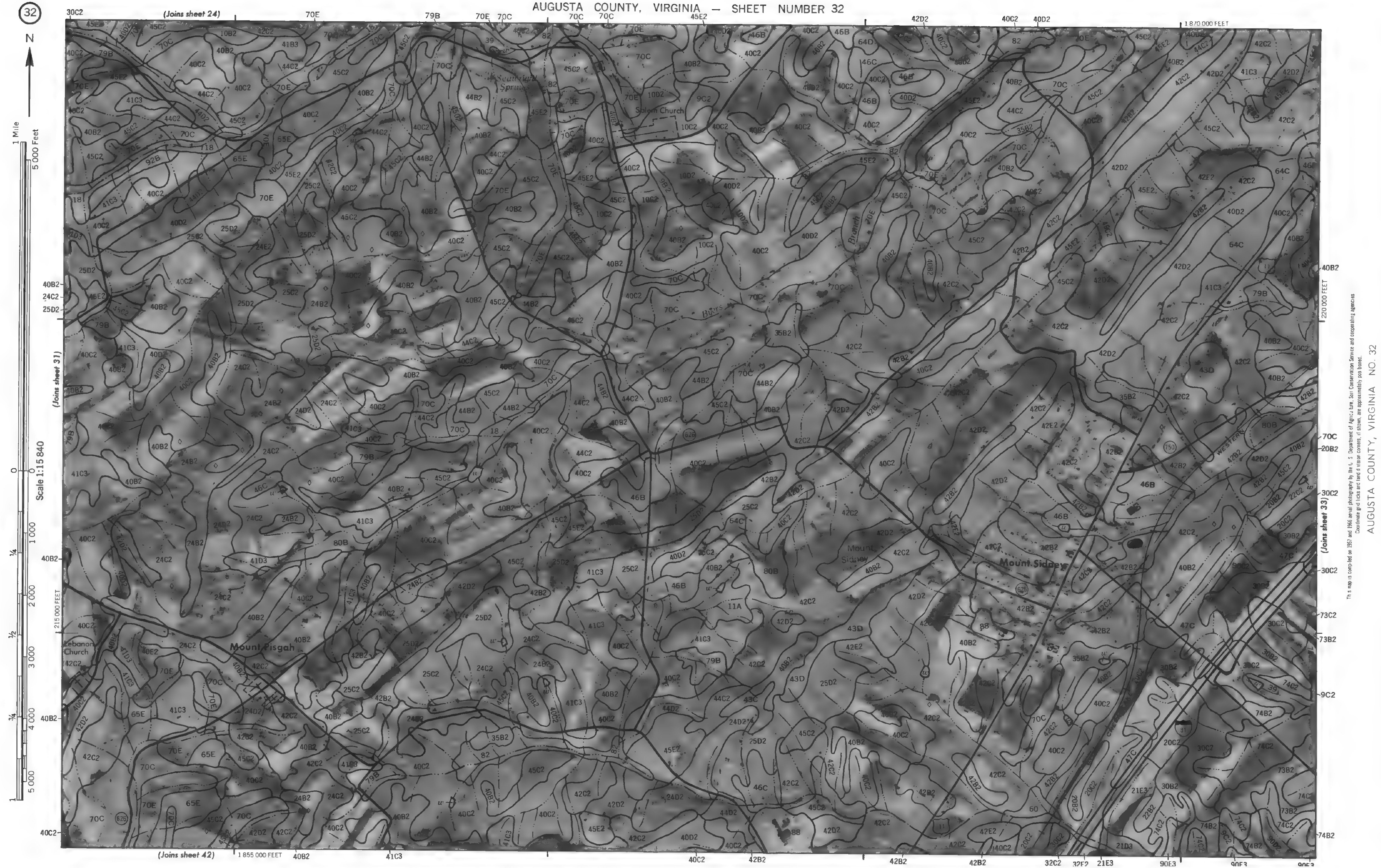
(31)



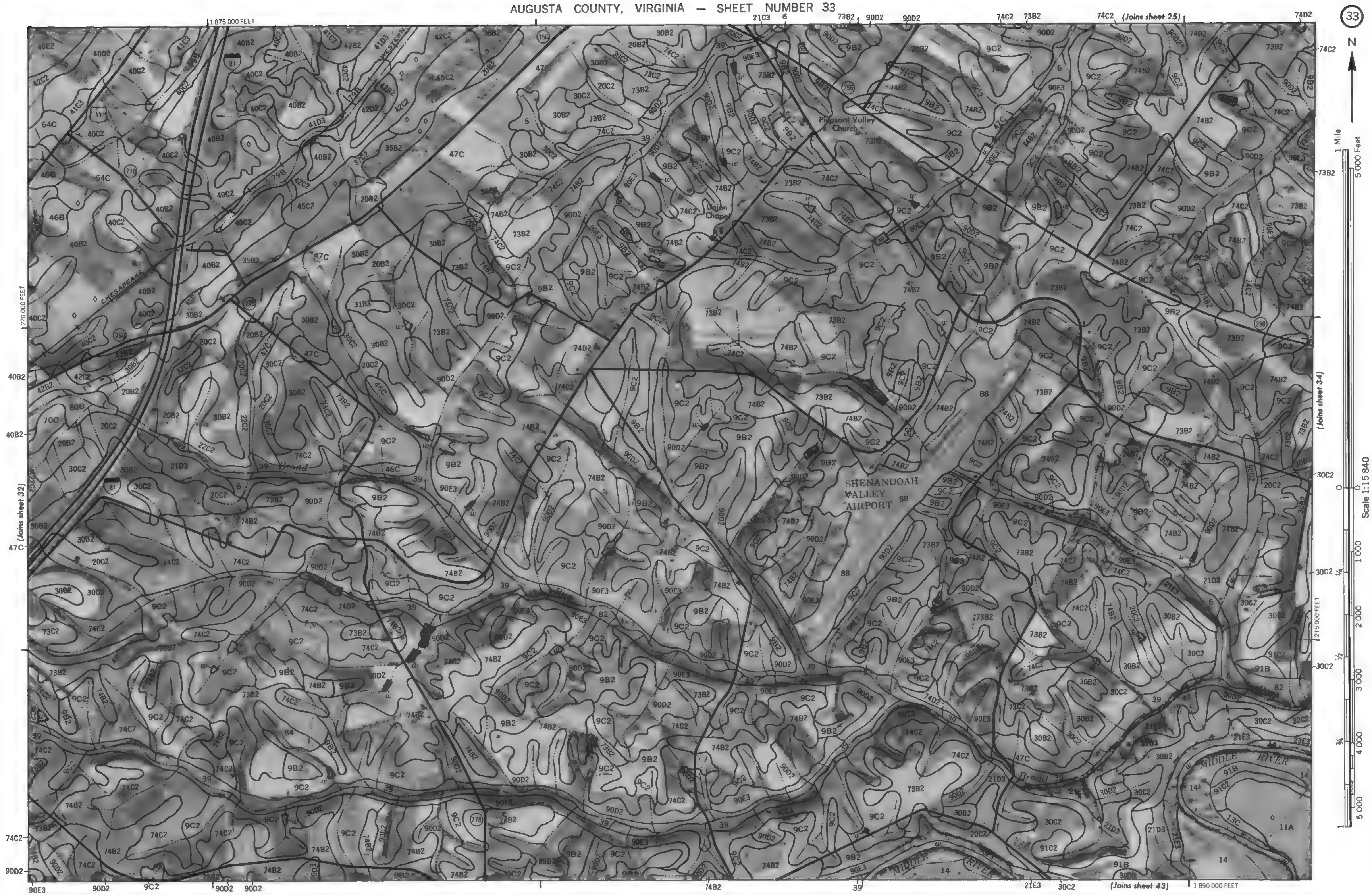
AUGUSTA COUNTY, VIRGINIA NO. 31

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 32

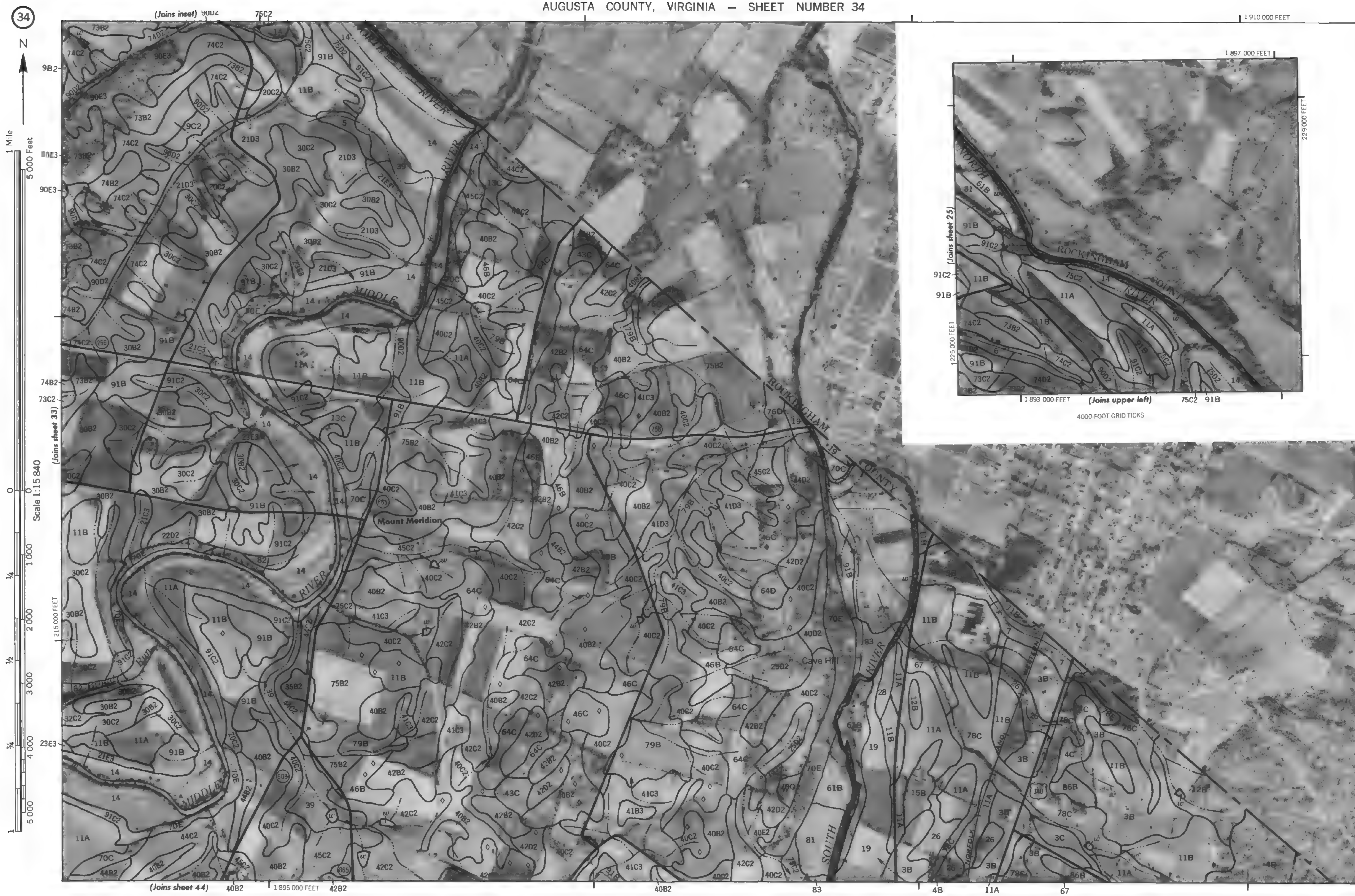


AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 33



AUGUSTA COUNTY, VIRGINIA NO. 33

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies
Coordinate grid ticks and and division corners if shown, are approximately positioned

AUGUSTA COUNTY, VIRGINIA NO. 35

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(36)

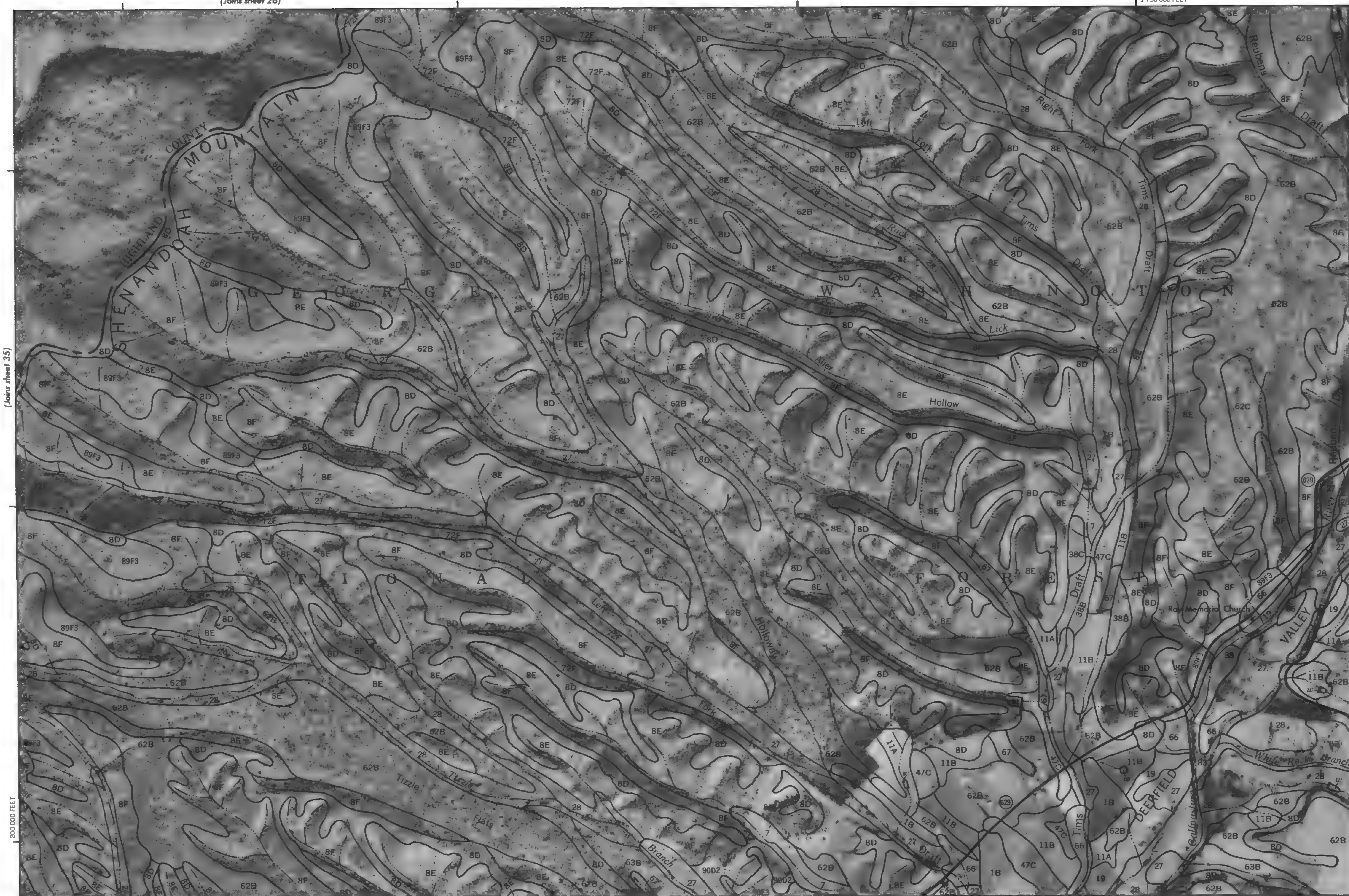
N

(Joins sheet 26)

1 750 000 FEET

(Joins sheet 35)

(Joins sheet 37)



1 735 000 FEET

(Joins sheet 47)

1 Mile

5 000 Feet

Scale 1:15 840

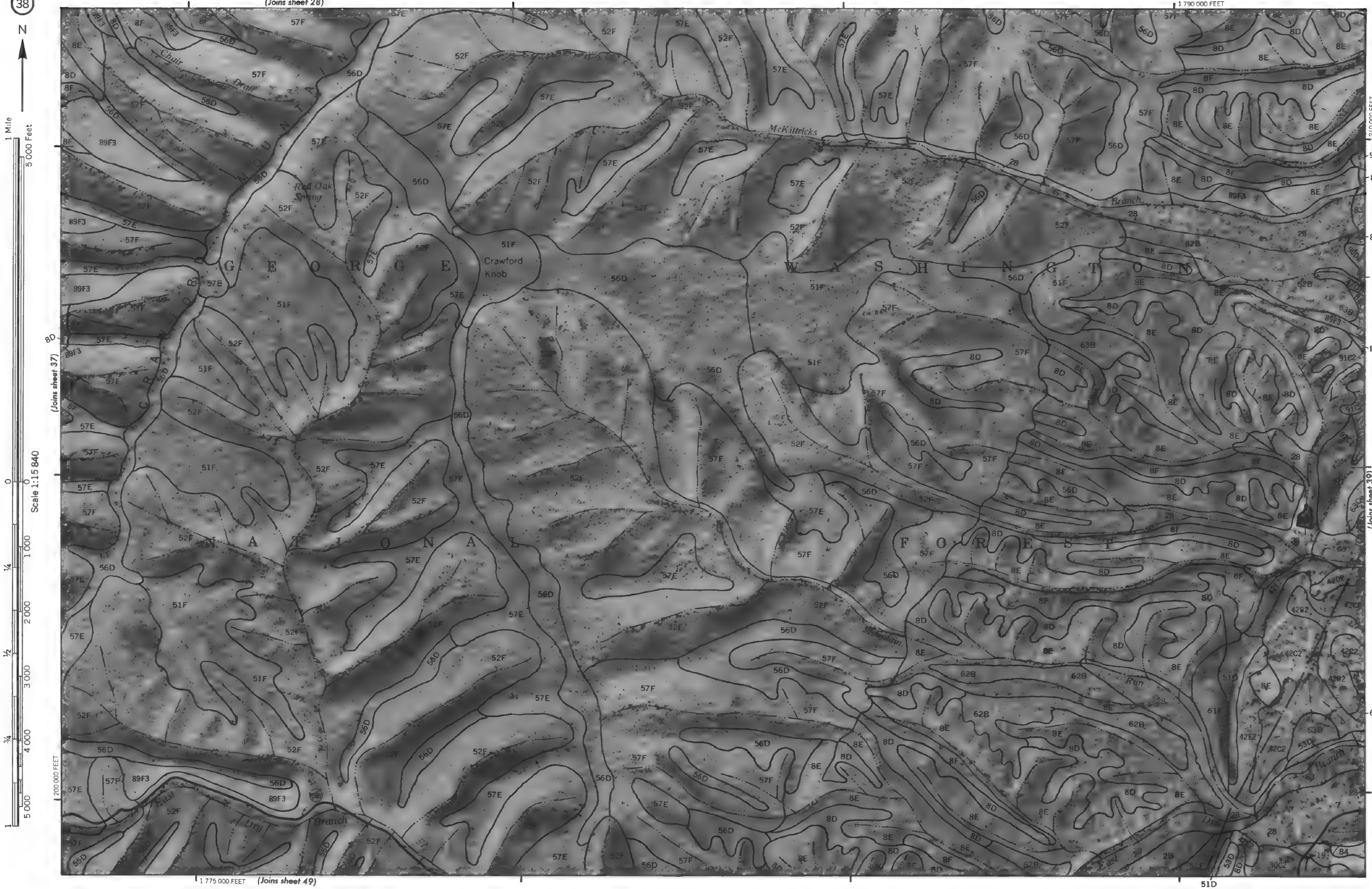
0 ¼ ½ ¾ 1

0 1000 2000 3000 4000 5000

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

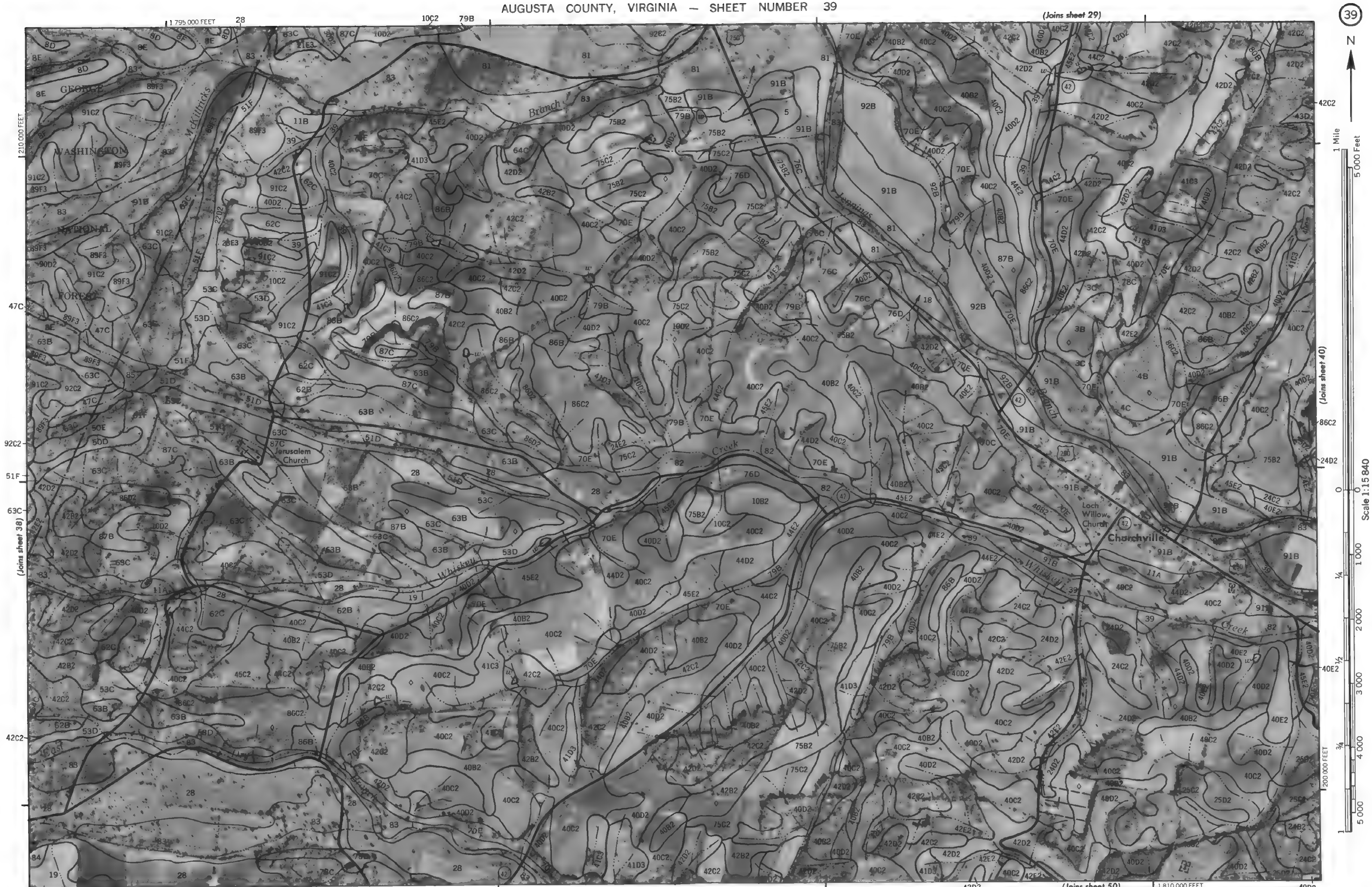
AUGUSTA COUNTY, VIRGINIA NO. 37

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



AUGUSTA COUNTY, VIRGINIA NO. 38

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 39



AUGUSTA COUNTY, VIRGINIA NO. 39

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 4

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA NO. 4

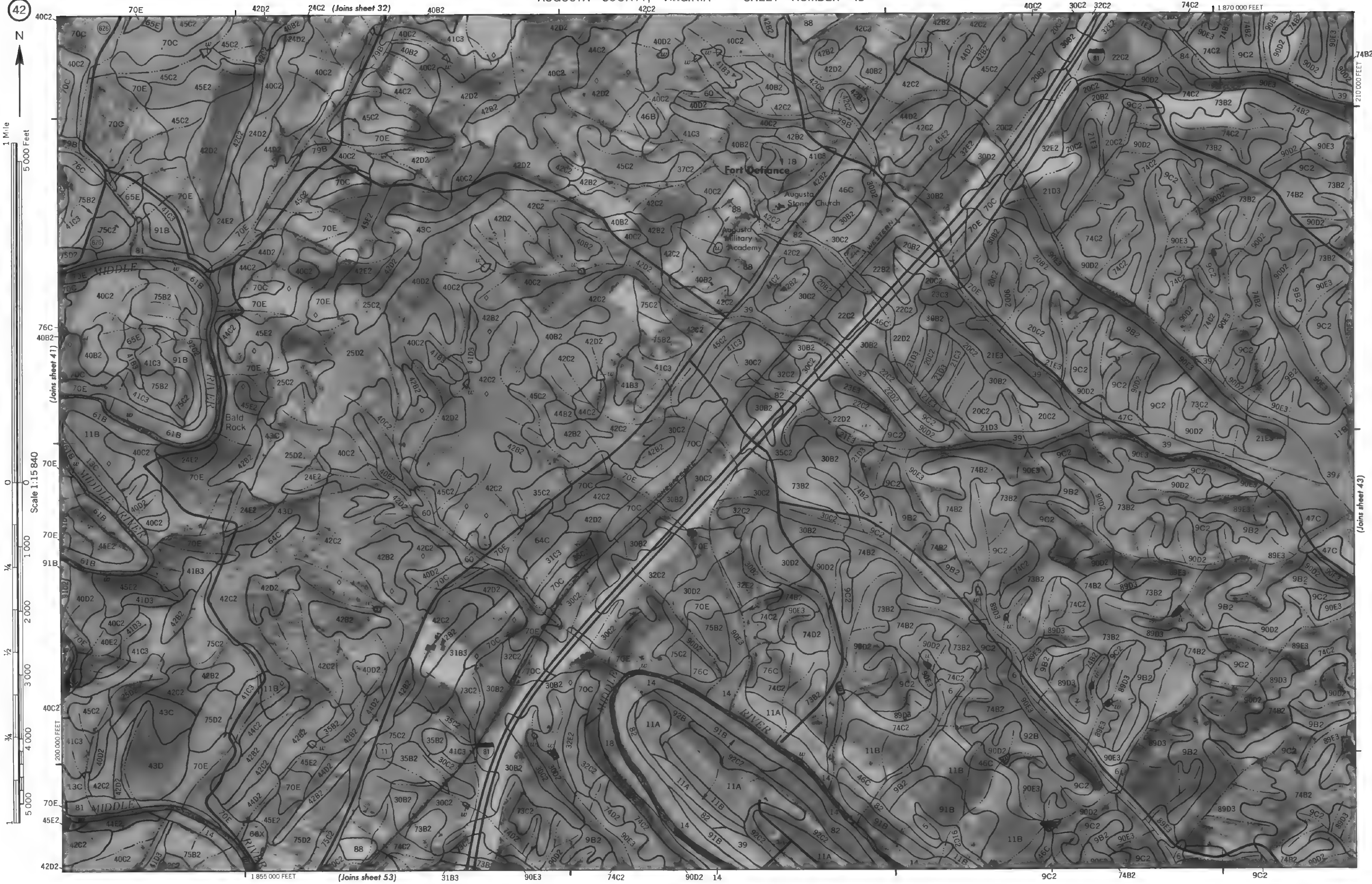
This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA NO. 40

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 41

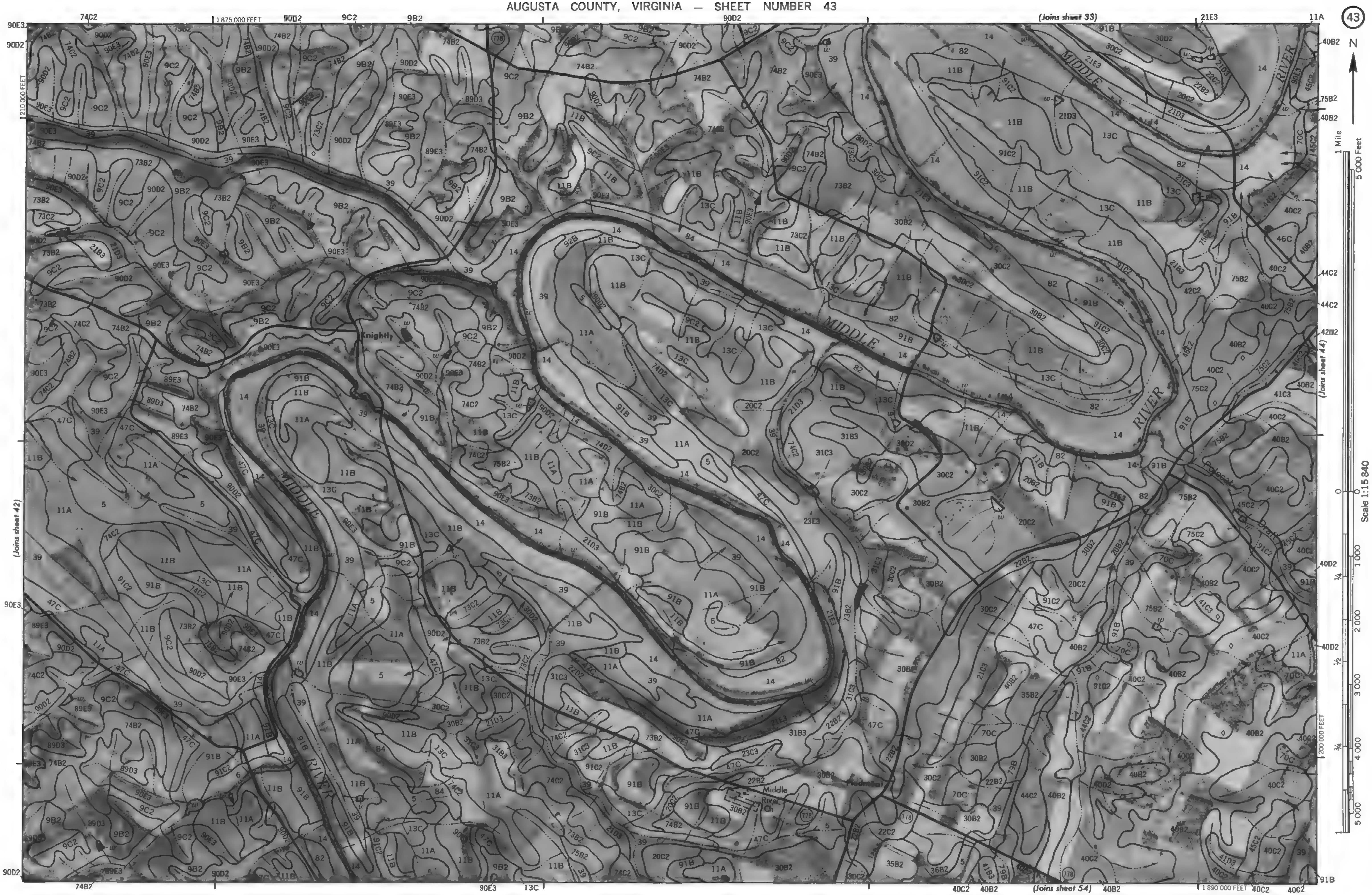
AUGUSTA COUNTY, VIRGINIA NO. 41

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA NO. 42



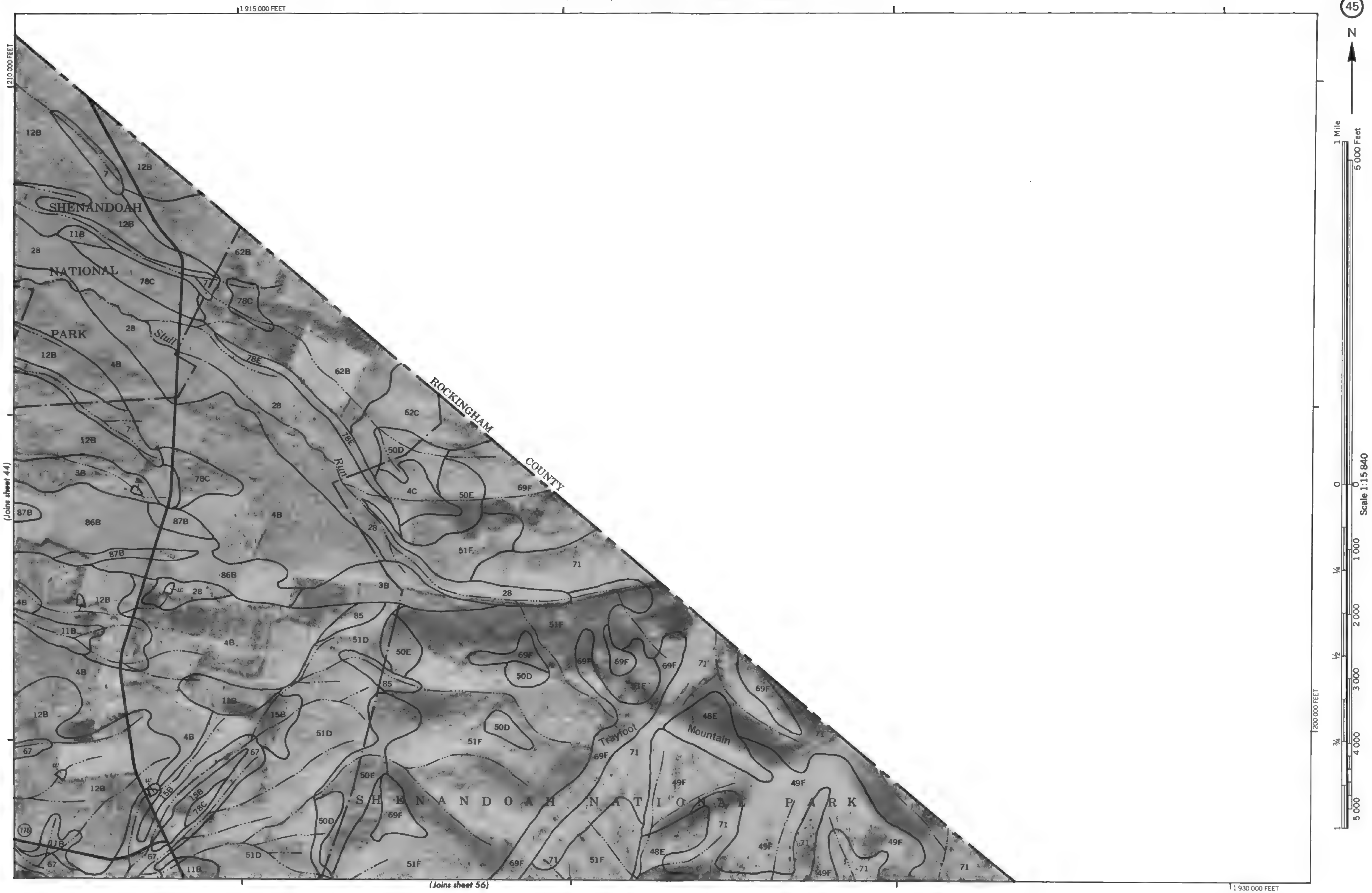
AUGUSTA COUNTY, VIRGINIA NO. 43

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 44

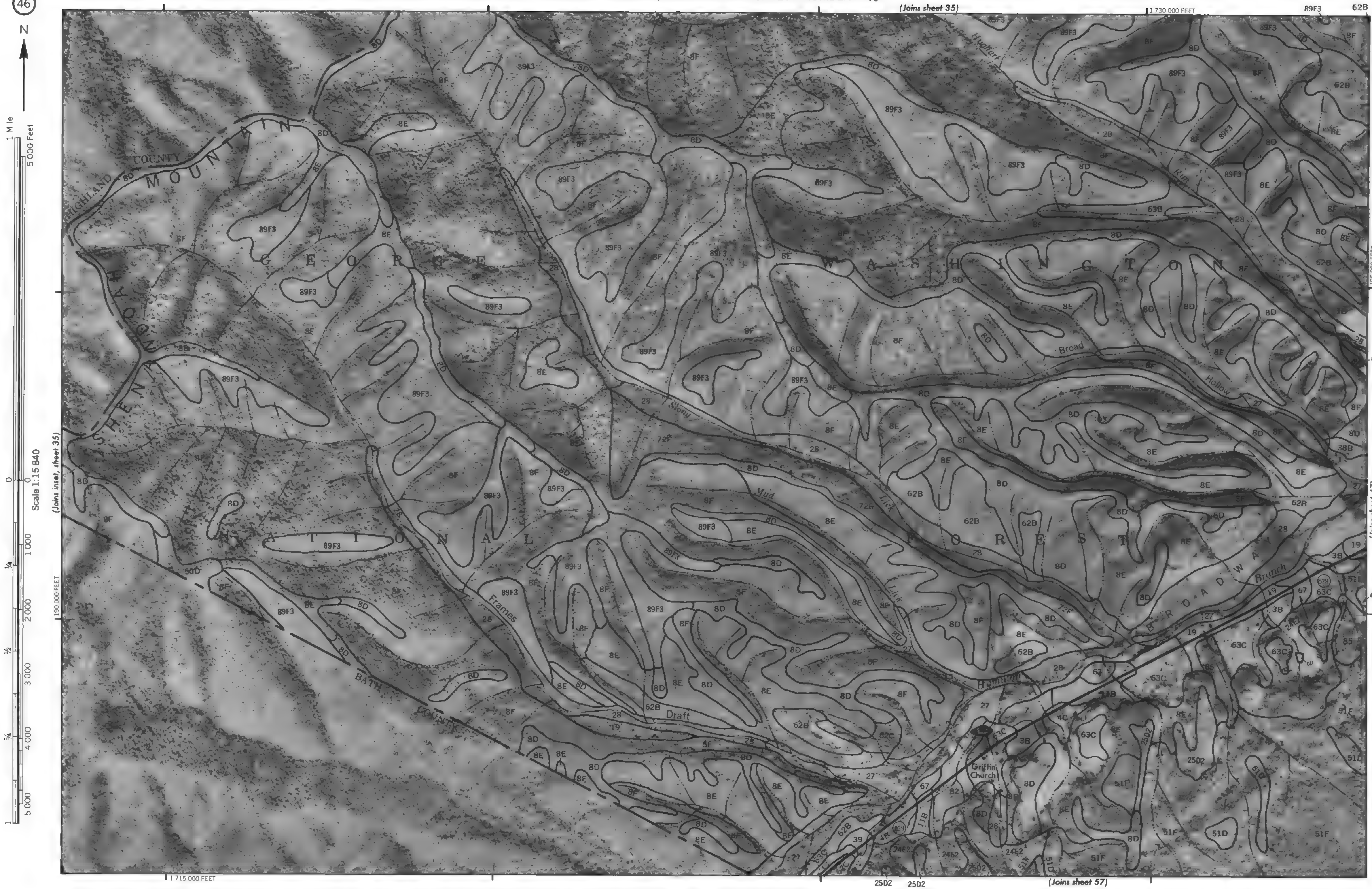
This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA NO. 44



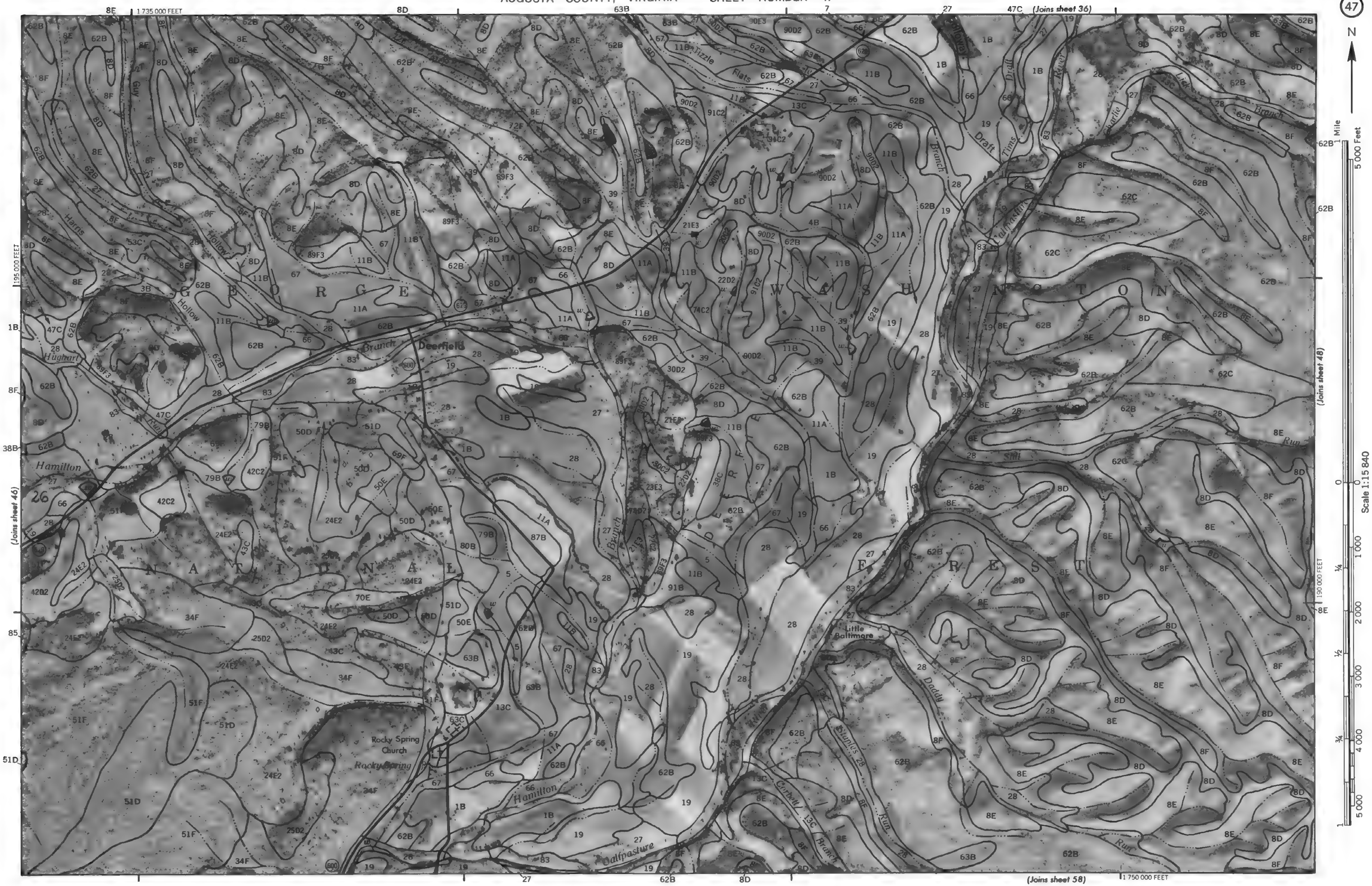
AUGUSTA COUNTY, VIRGINIA NO. 45

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA NO. 46



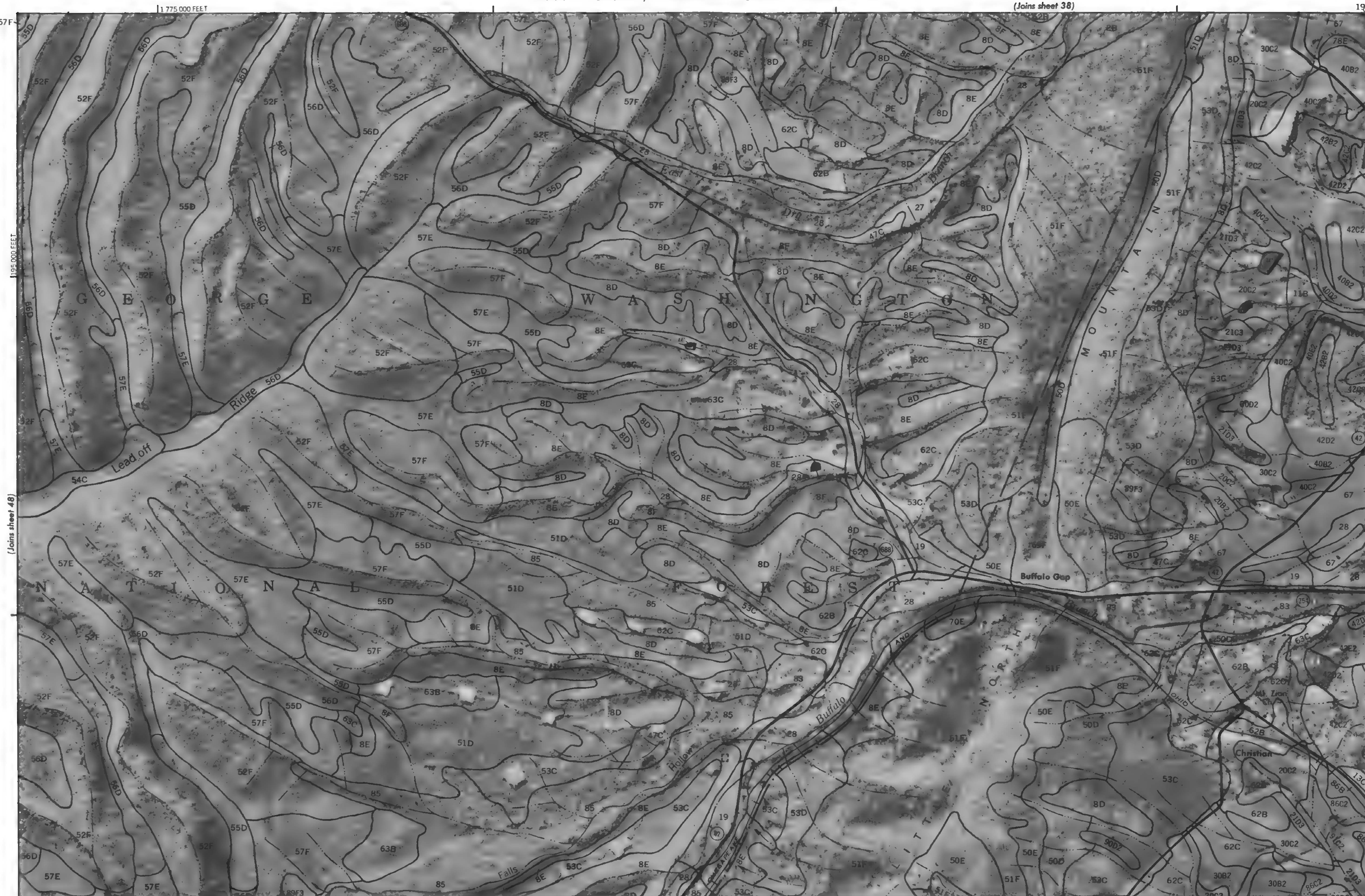
AUGUSTA COUNTY, VIRGINIA NO. 47

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA NO. 49

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

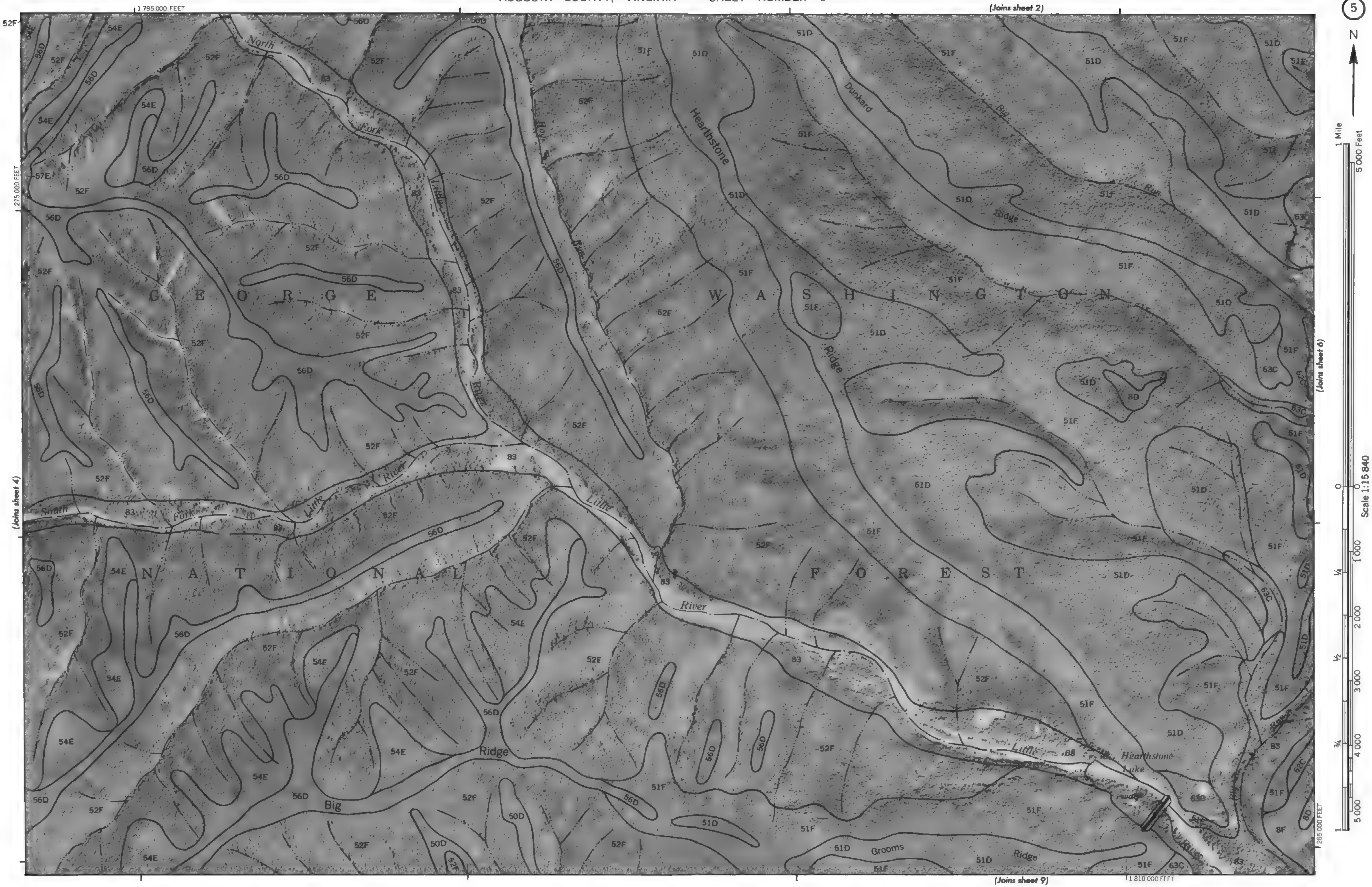


N

1 Mile

5 000 Feet

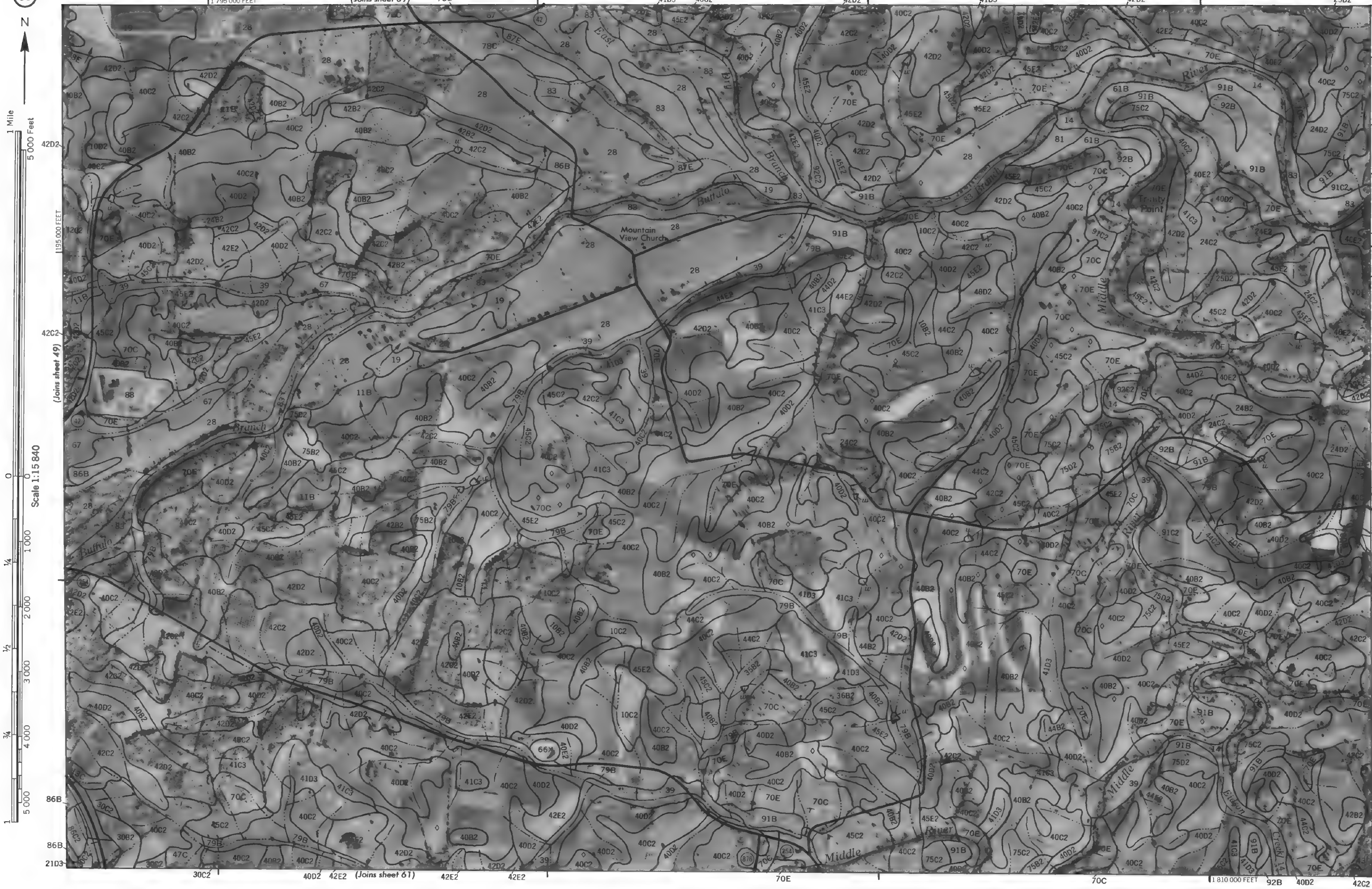
Scale 1:15 840



AUGUSTA COUNTY, VIRGINIA NO. 5

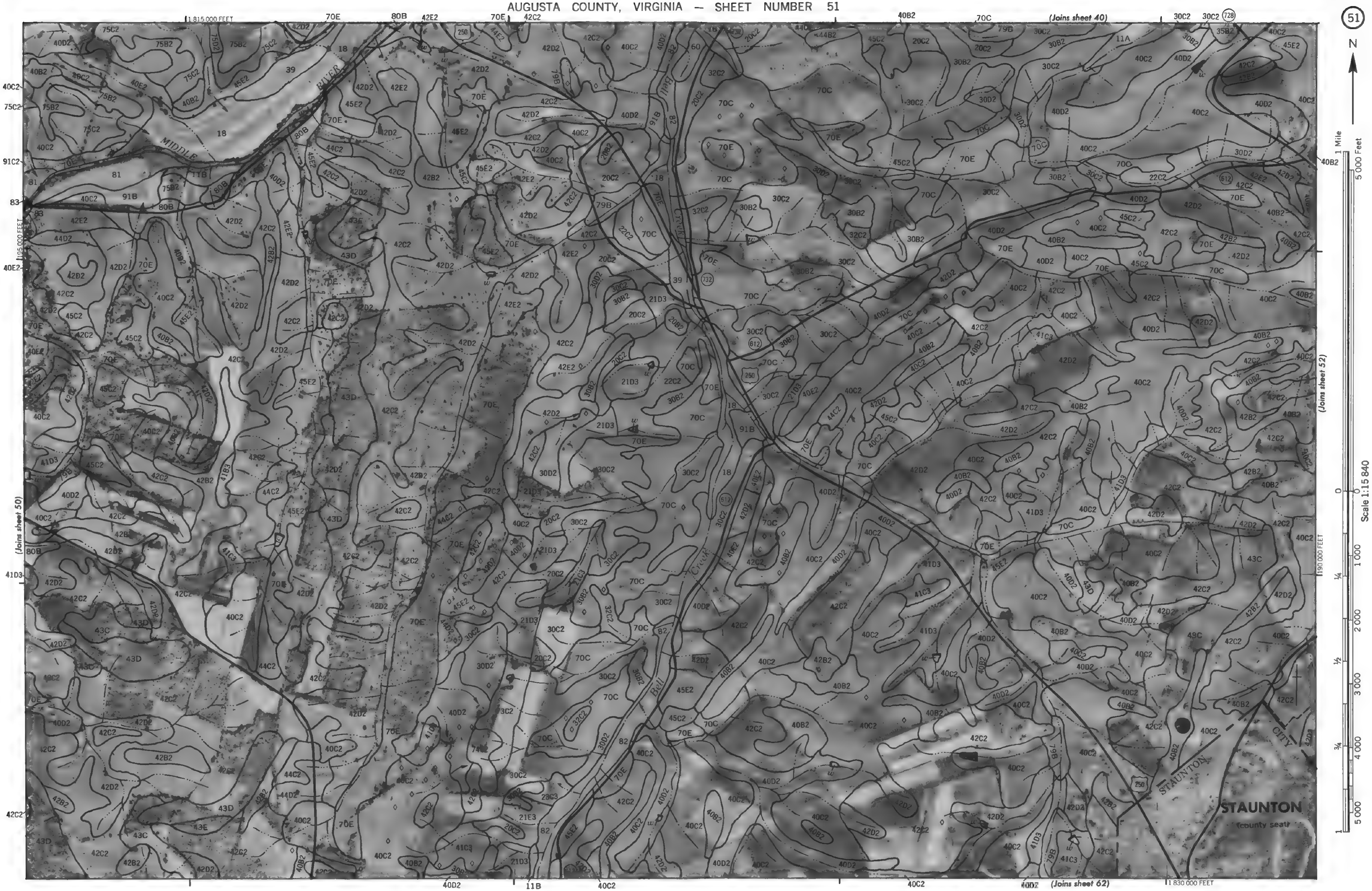
This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners, if shown, are approximately positioned

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 50



This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

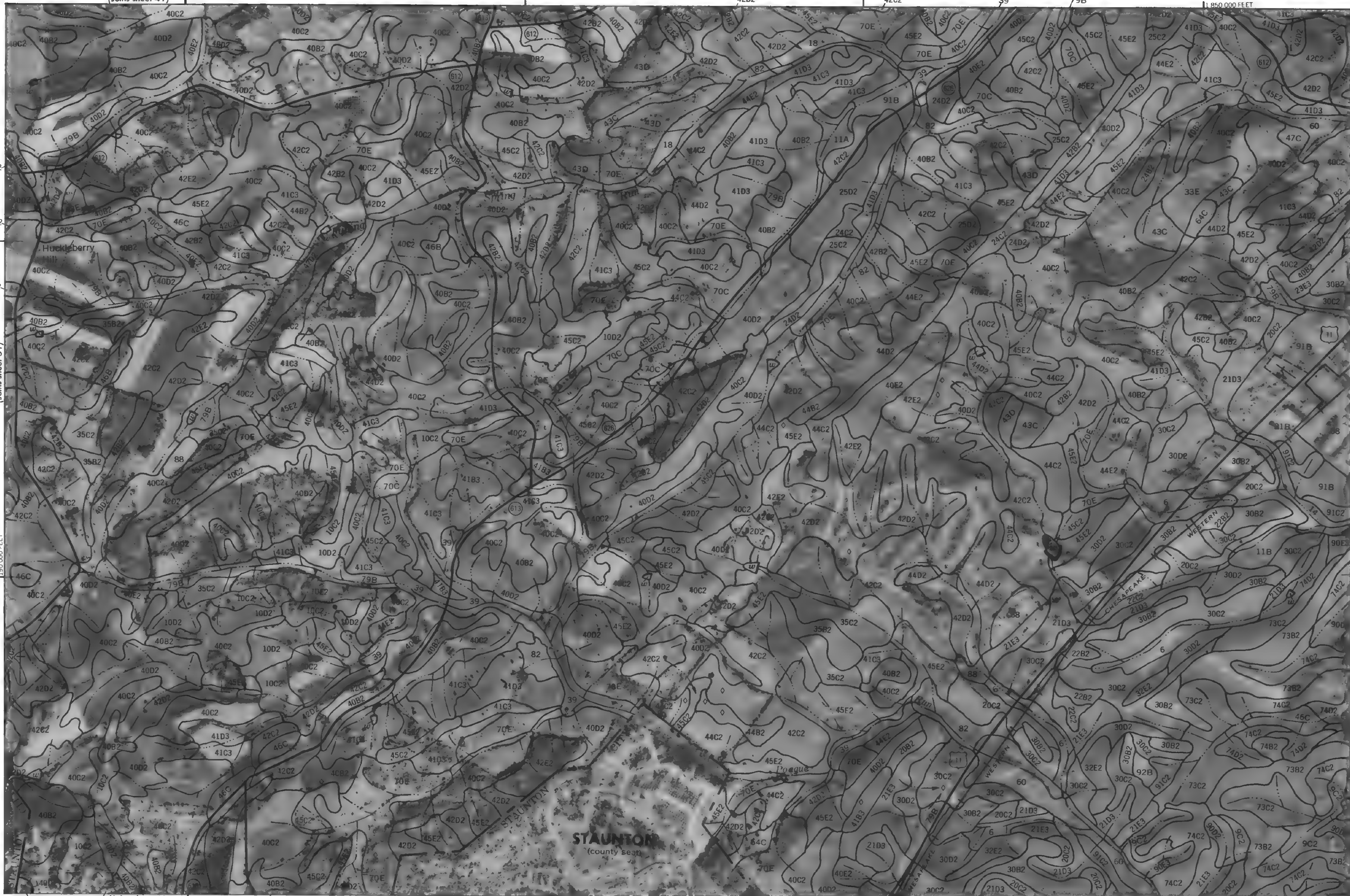
AUGUSTA COUNTY, VIRGINIA NO. 50



AUGUSTA COUNTY, VIRGINIA NO. 51

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 52



N

Scale 1:15 840

1 Mile — 5 000 Feet

0 — 1 000 — 2 000 — 3 000 — 4 000 — 5 000

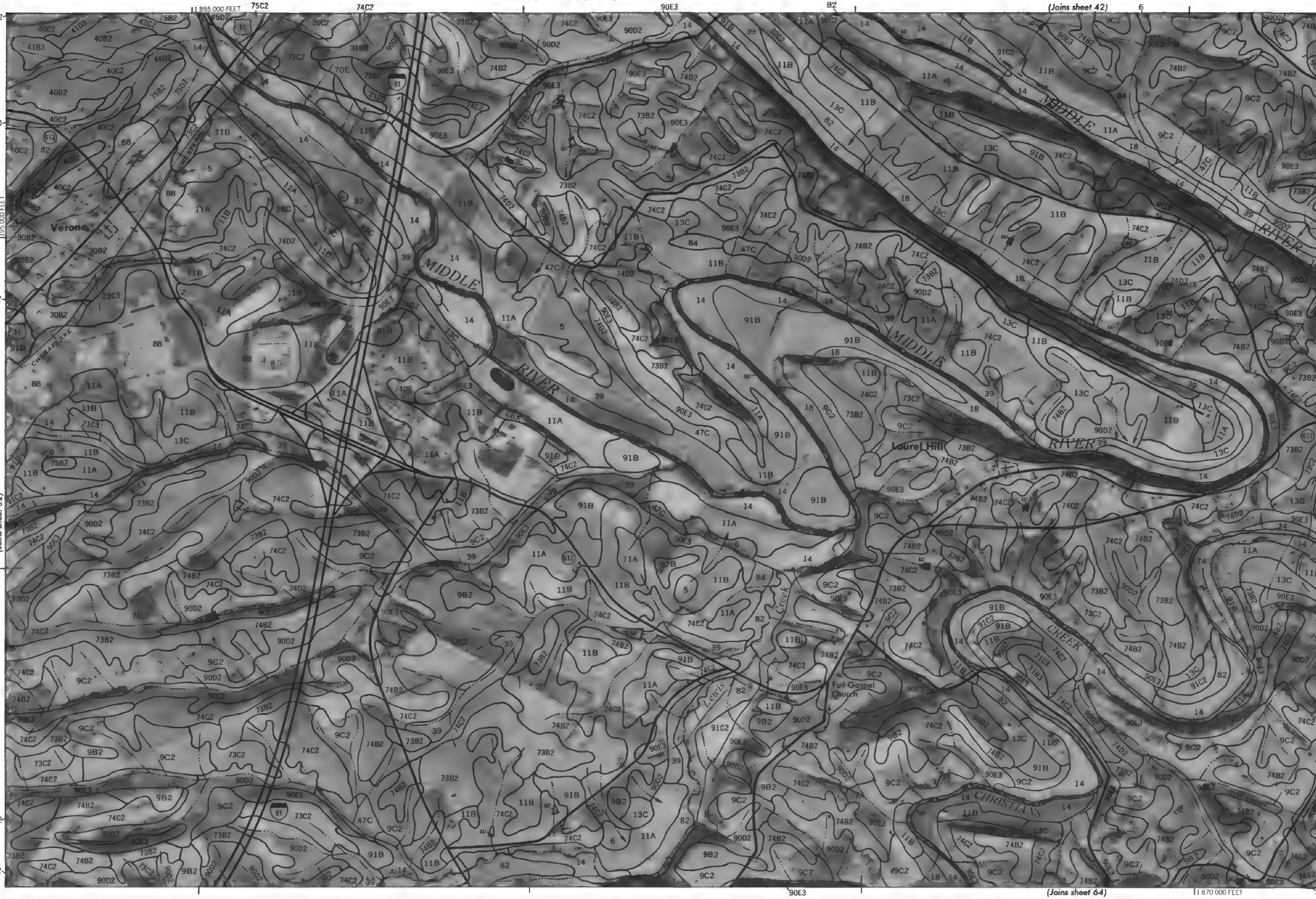
0 — 1/4 — 1/2 — 3/4 — 1

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA NO. 52

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 53

53



N

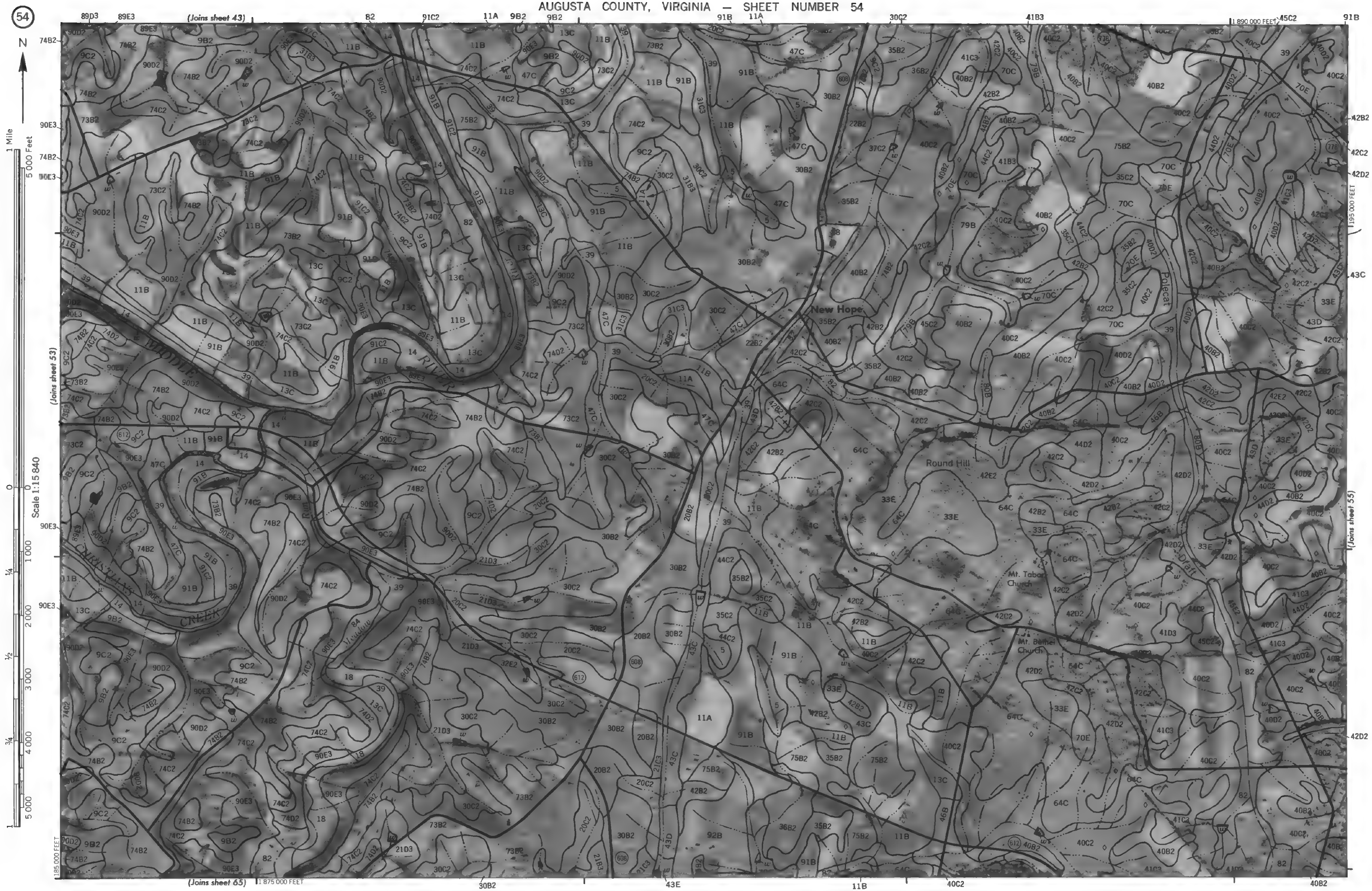
Scale 1:15 840

1 Mile

5 000 Feet

AUGUSTA COUNTY, VIRGINIA NO. 53

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

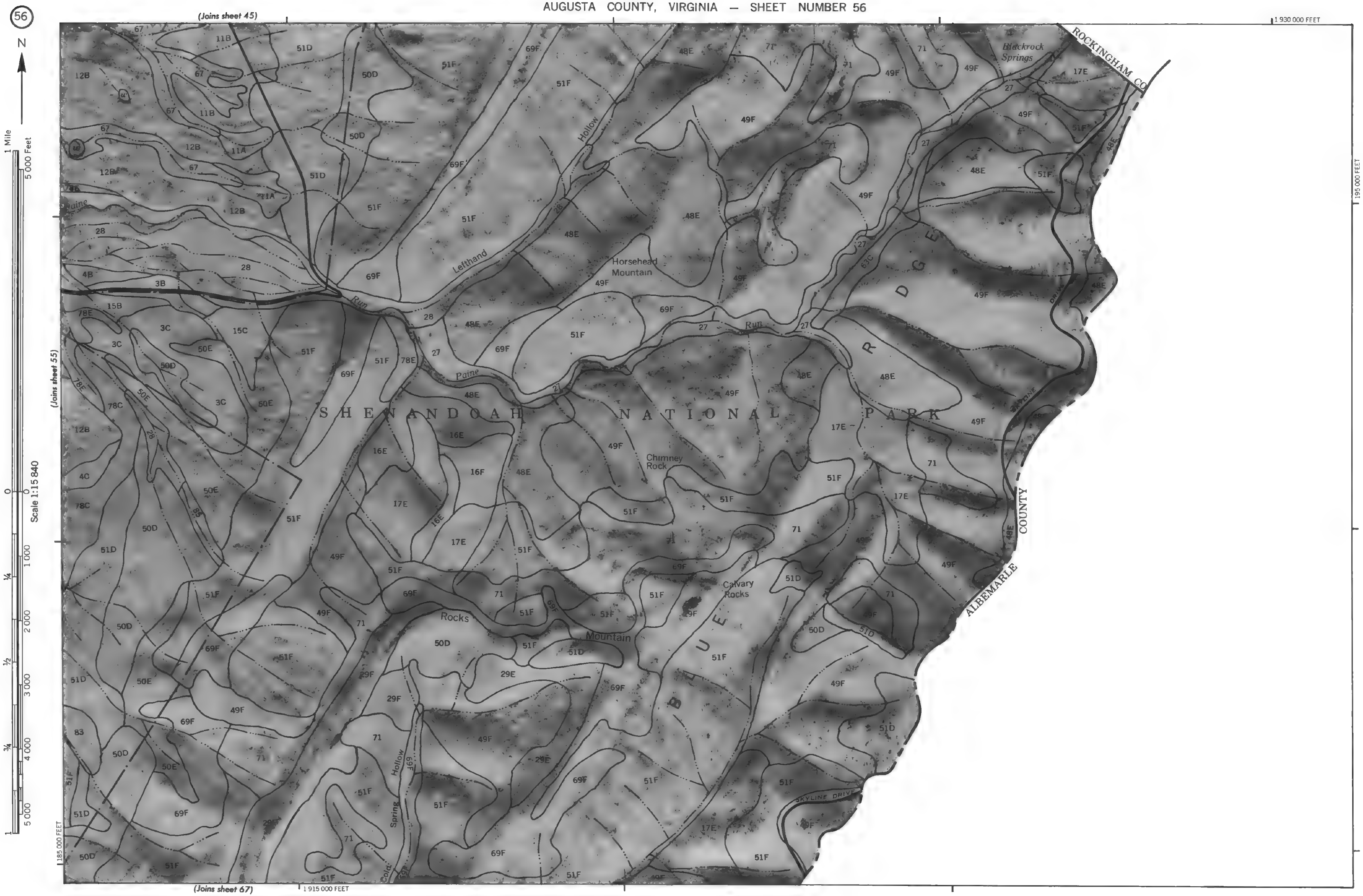
AUGUSTA COUNTY, VIRGINIA NO. 54

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 55

AUGUSTA COUNTY, VIRGINIA NO. 55

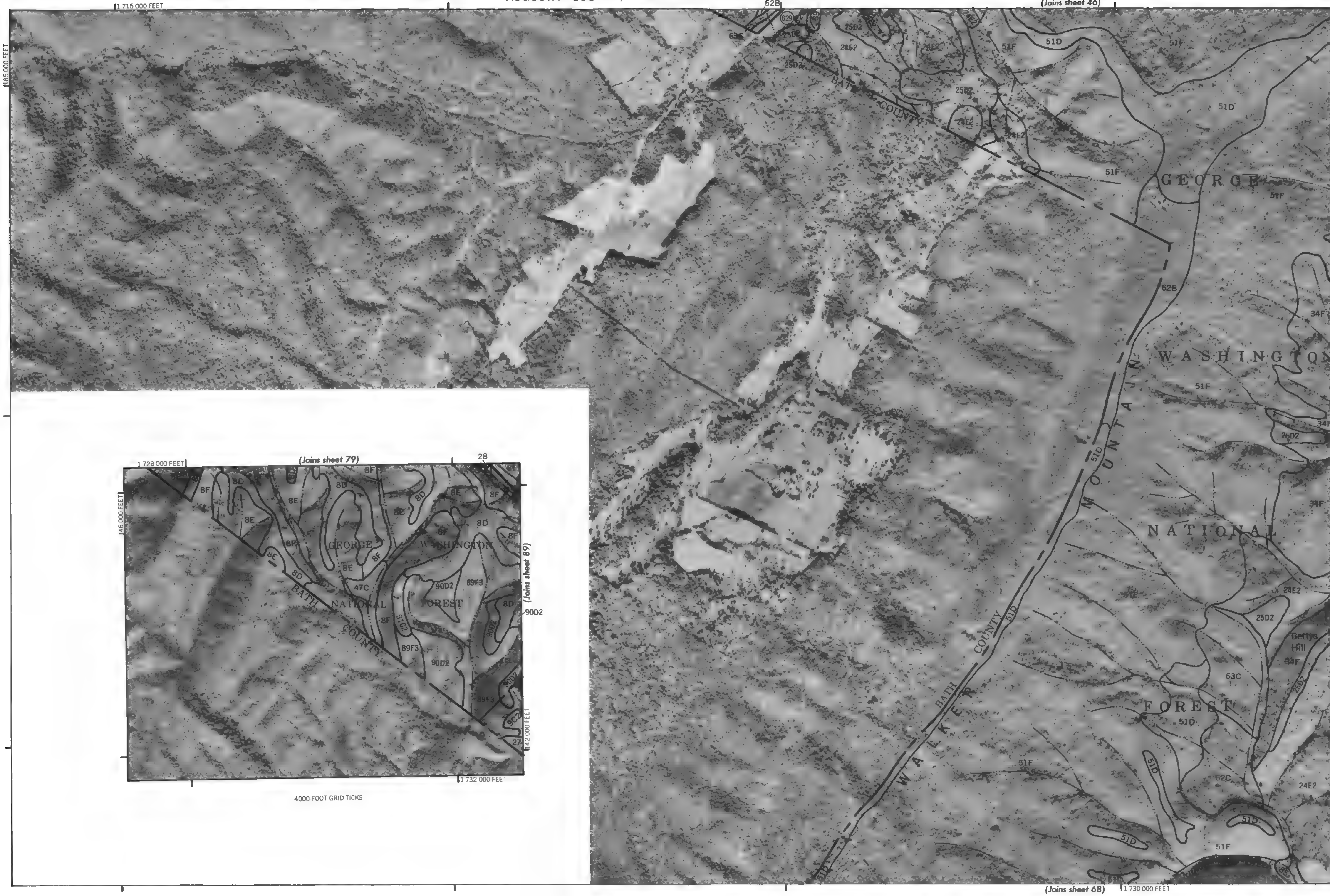
This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 56



This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA NO. 56



57

N

1 Mile
5 000 Feet
0
¼
½
¾
1 000
2 000
3 000
4 000
5 000
Scale 1:15 840

AUGUSTA COUNTY, VIRGINIA NO. 57

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners, if shown, are approximately positioned

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA NO. 58

59

N

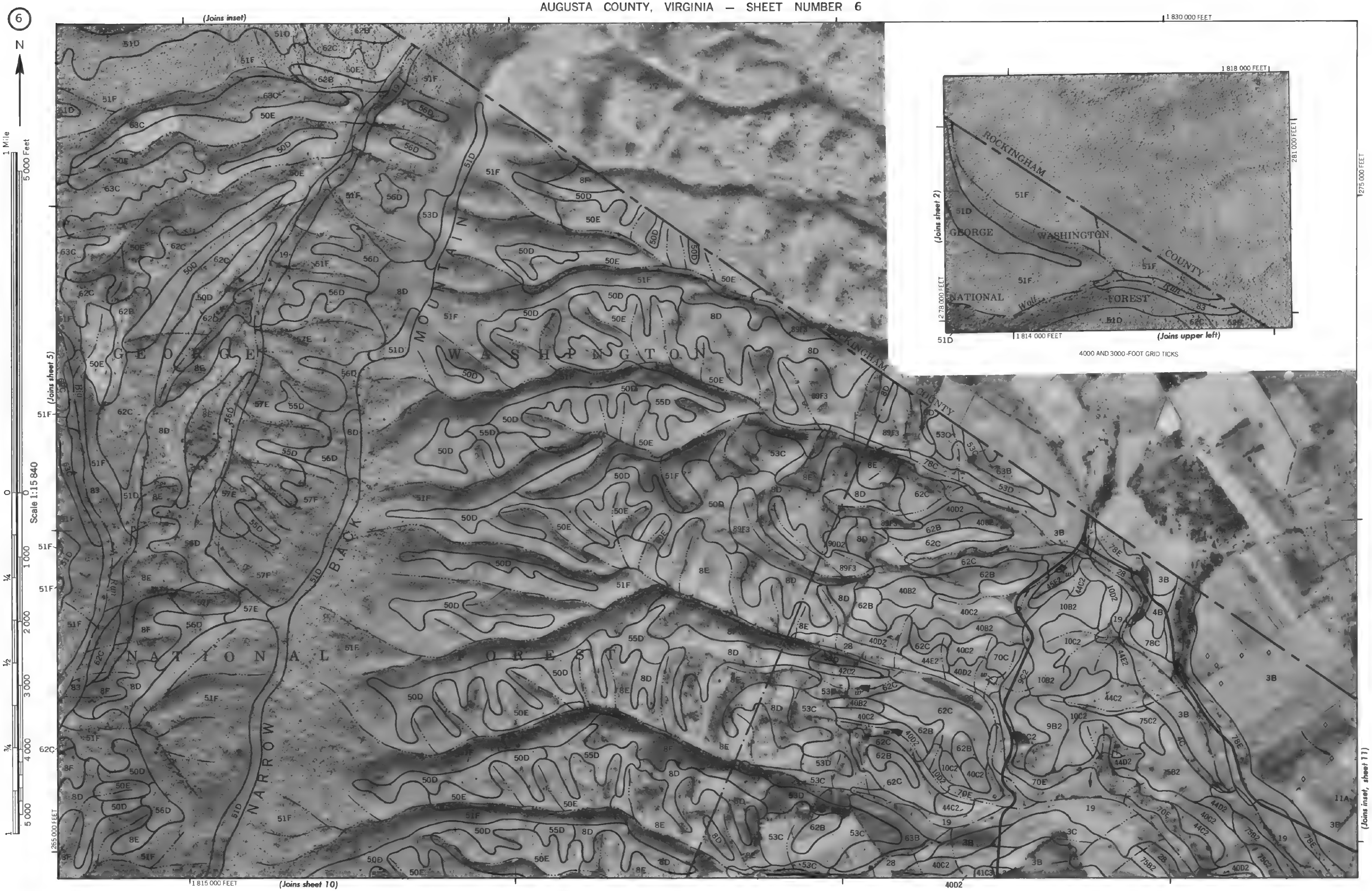
Scale 1:15 840

1 Mile

5 000 Feet

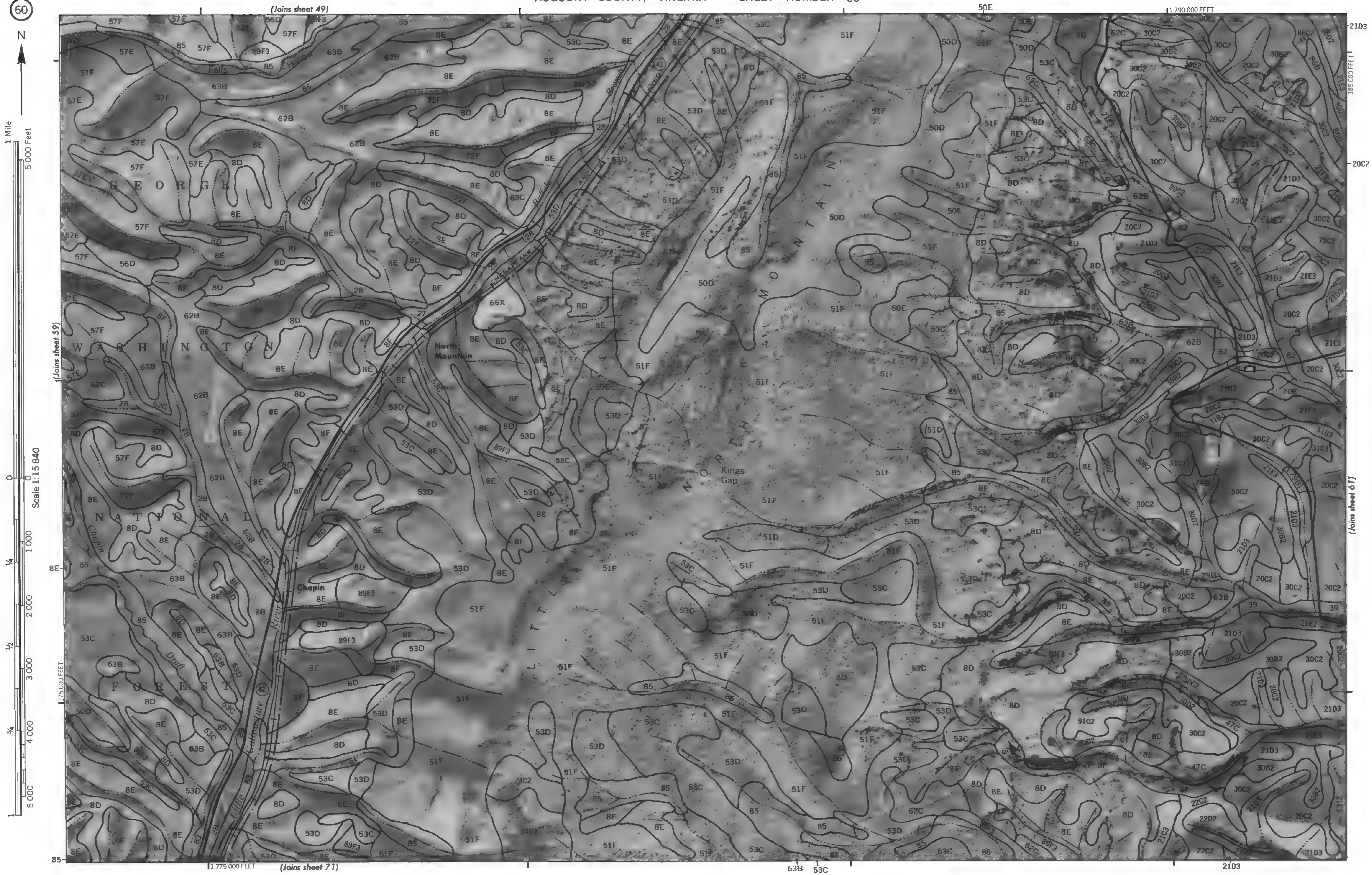
AUGUSTA COUNTY, VIRGINIA NO. 59

This map is compiled on 1957 and 1960 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1957 and 1966 aerial photography by the U S Department of Agriculture, Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA NO. 6



This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA NO. 60

AUGUSTA COUNTY, VIRGINIA NO. 61

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 62

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA NO. 62

63

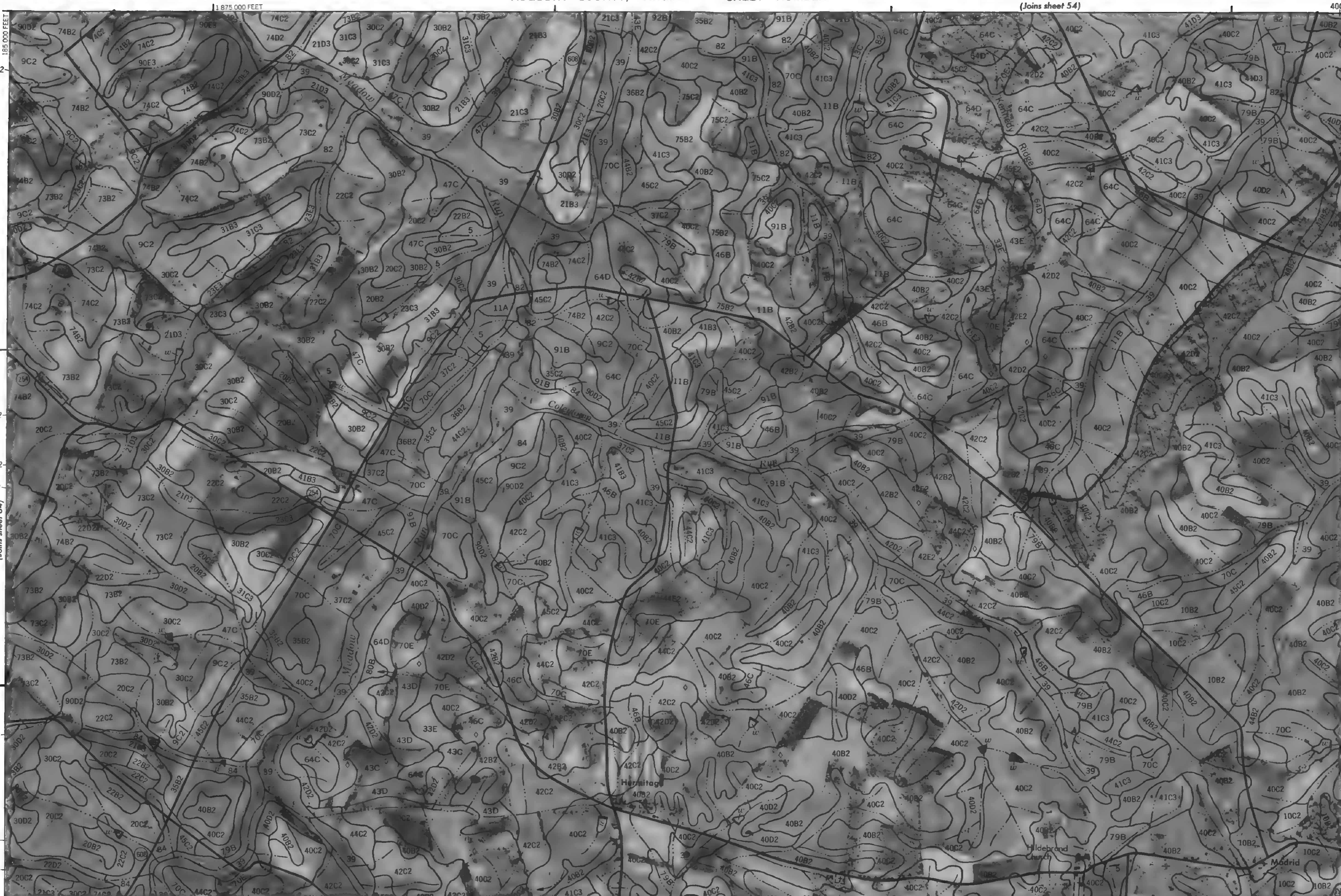
AUGUSTA COUNTY, VIRGINIA NO. 63

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA NO. 64

65



N

Scale 1:15 840

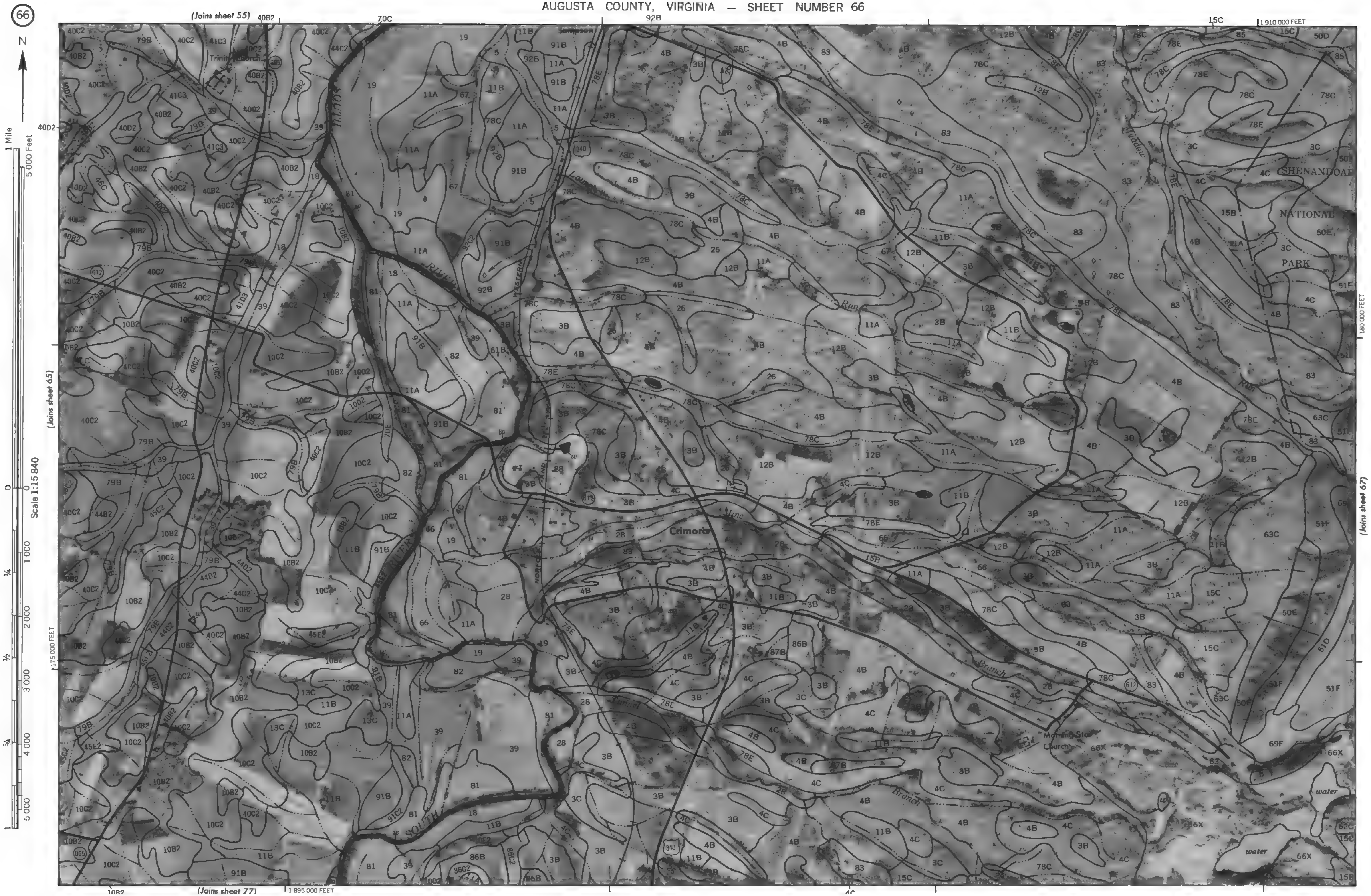
1 Mile

5 000 Feet

AUGUSTA COUNTY, VIRGINIA NO. 65

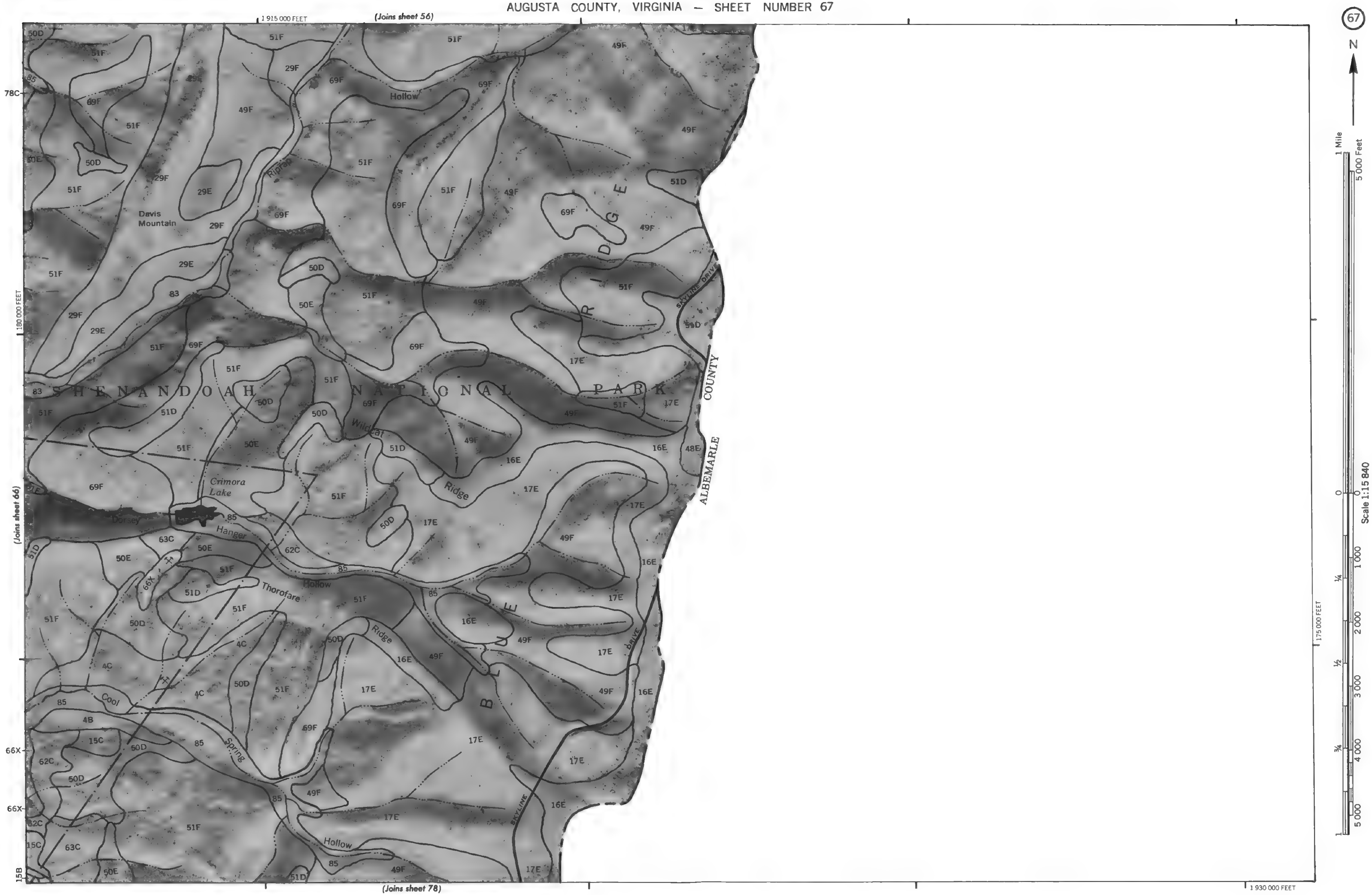
This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 66



This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners, if shown, are approximately positioned

AUGUSTA COUNTY, VIRGINIA NO. 66



AUGUSTA COUNTY, VIRGINIA NO. 67

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 68

N

1 Mile
5 000 Feet
Scale 1:15 840
0 ¼ ½ ¾ 1
0 1 000 2 000 3 000 4 000 5 000

This map is compiled on 1957 and 1956 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned

AUGUSTA COUNTY, VIRGINIA NO. 68

69

AUGUSTA COUNTY, VIRGINIA NO. 69

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

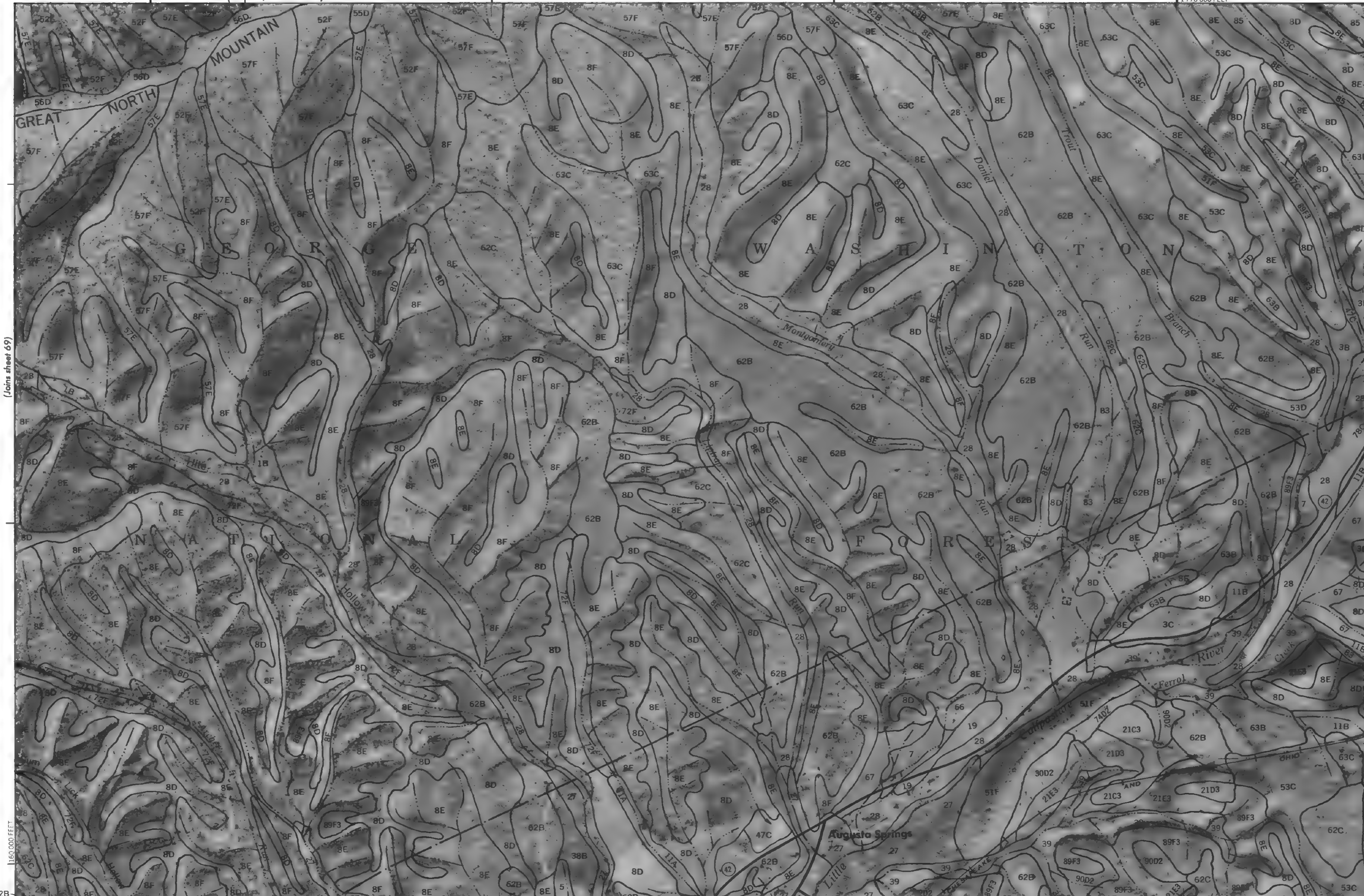
AUGUSTA COUNTY, VIRGINIA NO. 7

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 70

N

(Joins sheet 59)



(Joins sheet 69)

(Joins sheet 71)

(Joins sheet 81)

1 770 000 FEET

170 000 FEET

160 000 FEET

1 755 000 FEET

Scale 1:15 840

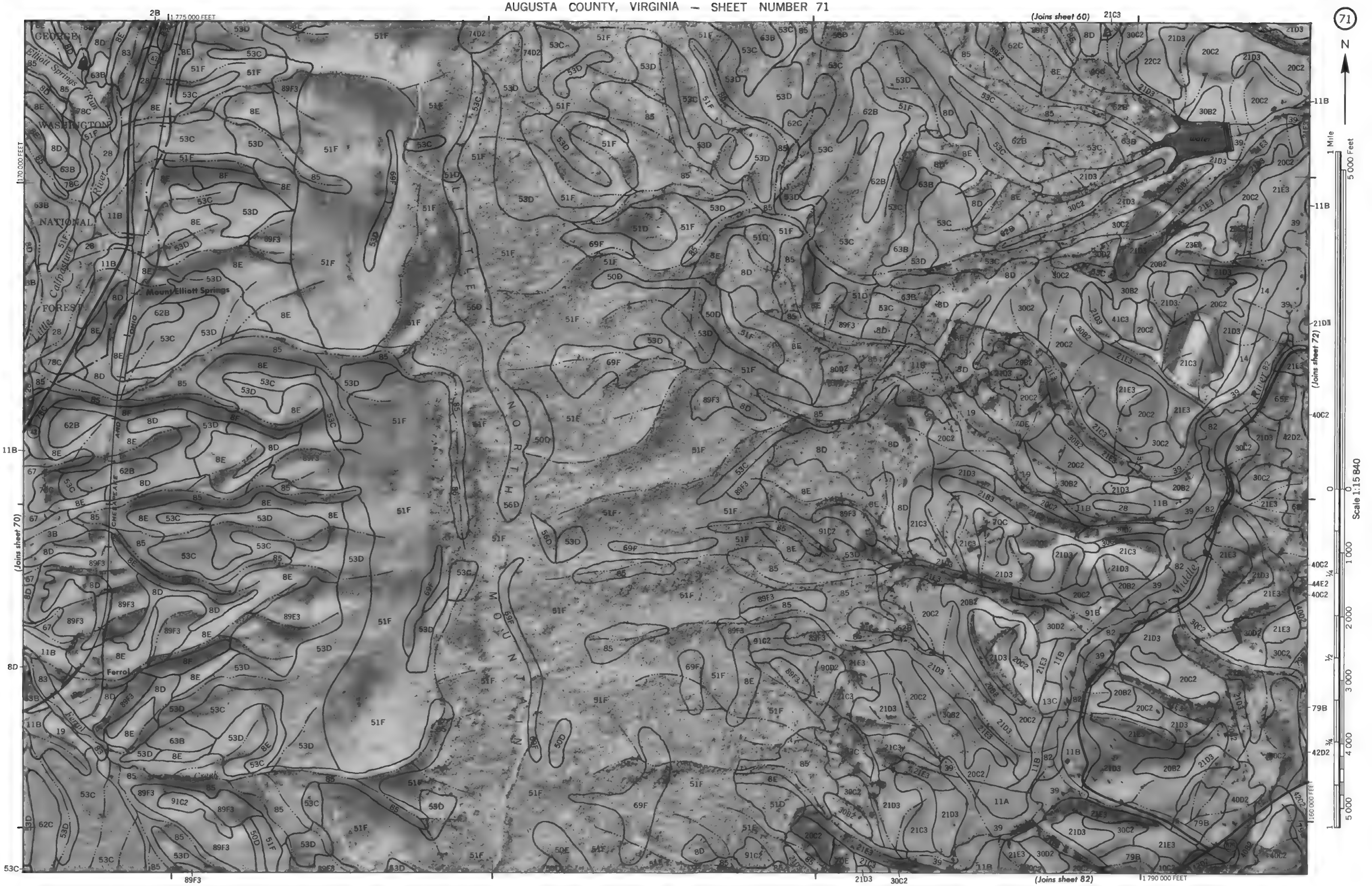
1 Mile — 0 — ¼ — ½ — ¾ — 1

5 000 Feet — 0 — 1 000 — 2 000 — 3 000 — 4 000 — 5 000

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA NO. 70

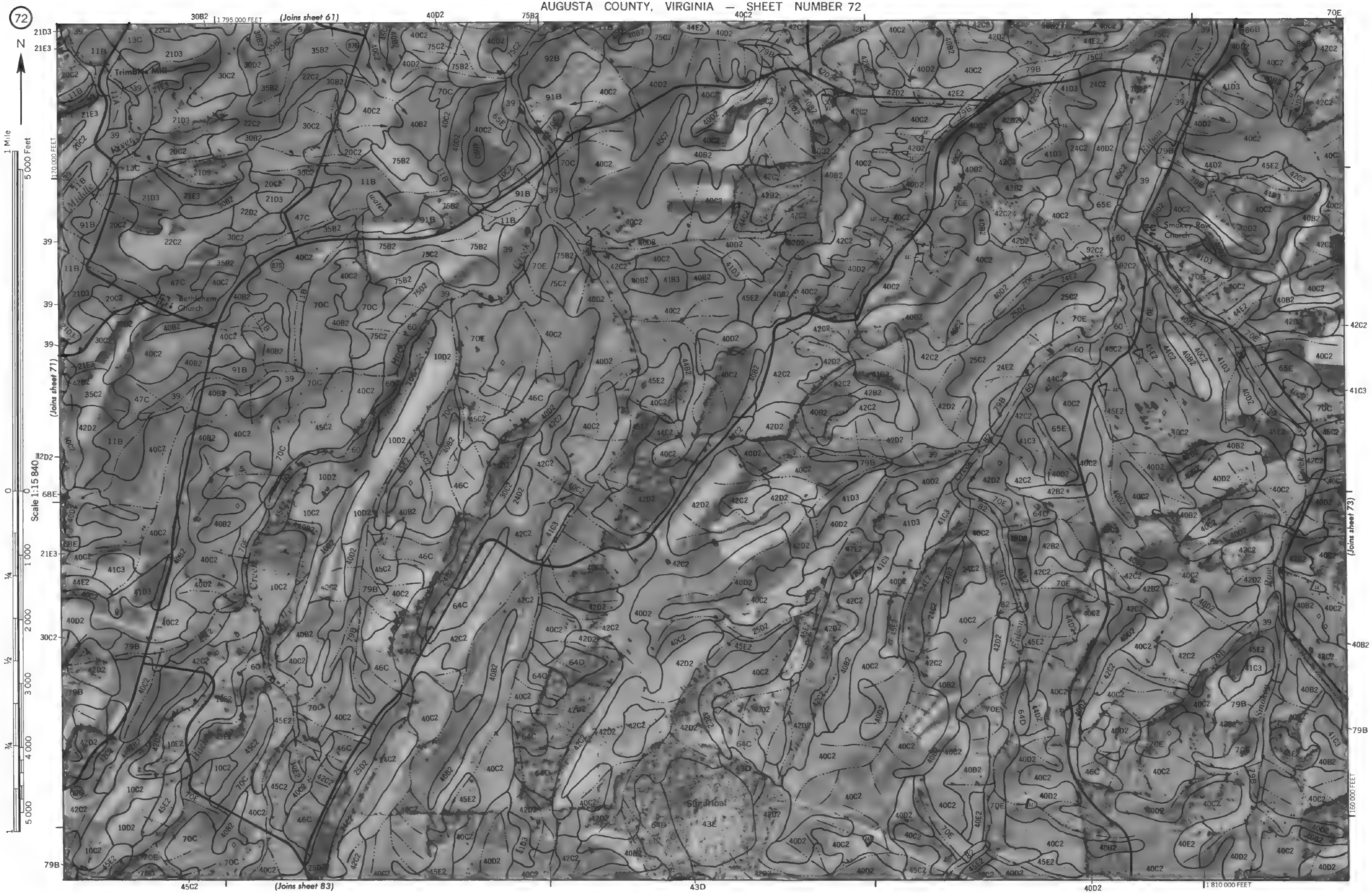
AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 71



AUGUSTA COUNTY, VIRGINIA NO. 71

This map [redacted] 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 72



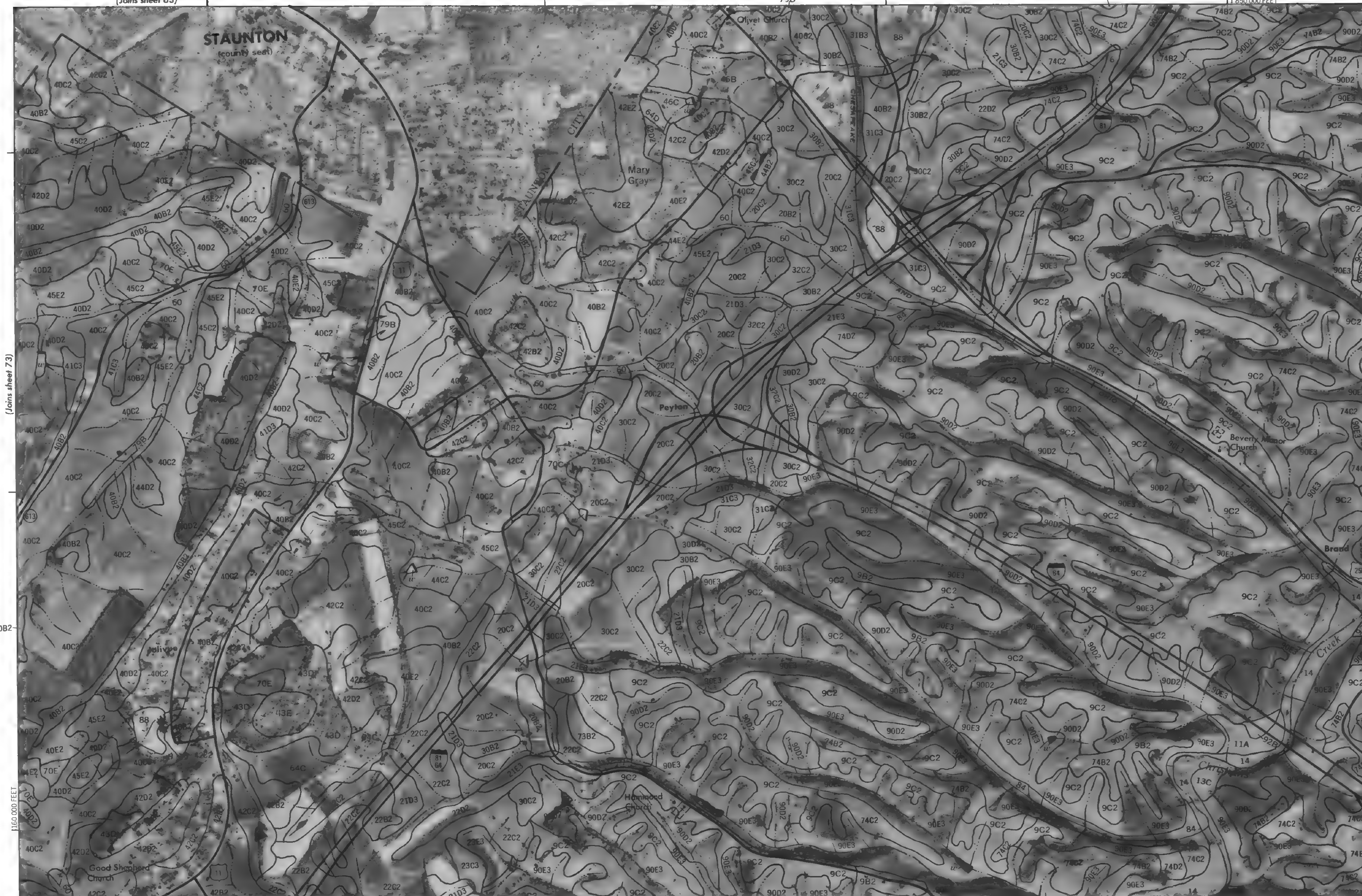
This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners, if shown, are approximately positioned

AUGUSTA COUNTY, VIRGINIA NO. 73

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners, if shown, are approximately positioned

(74)

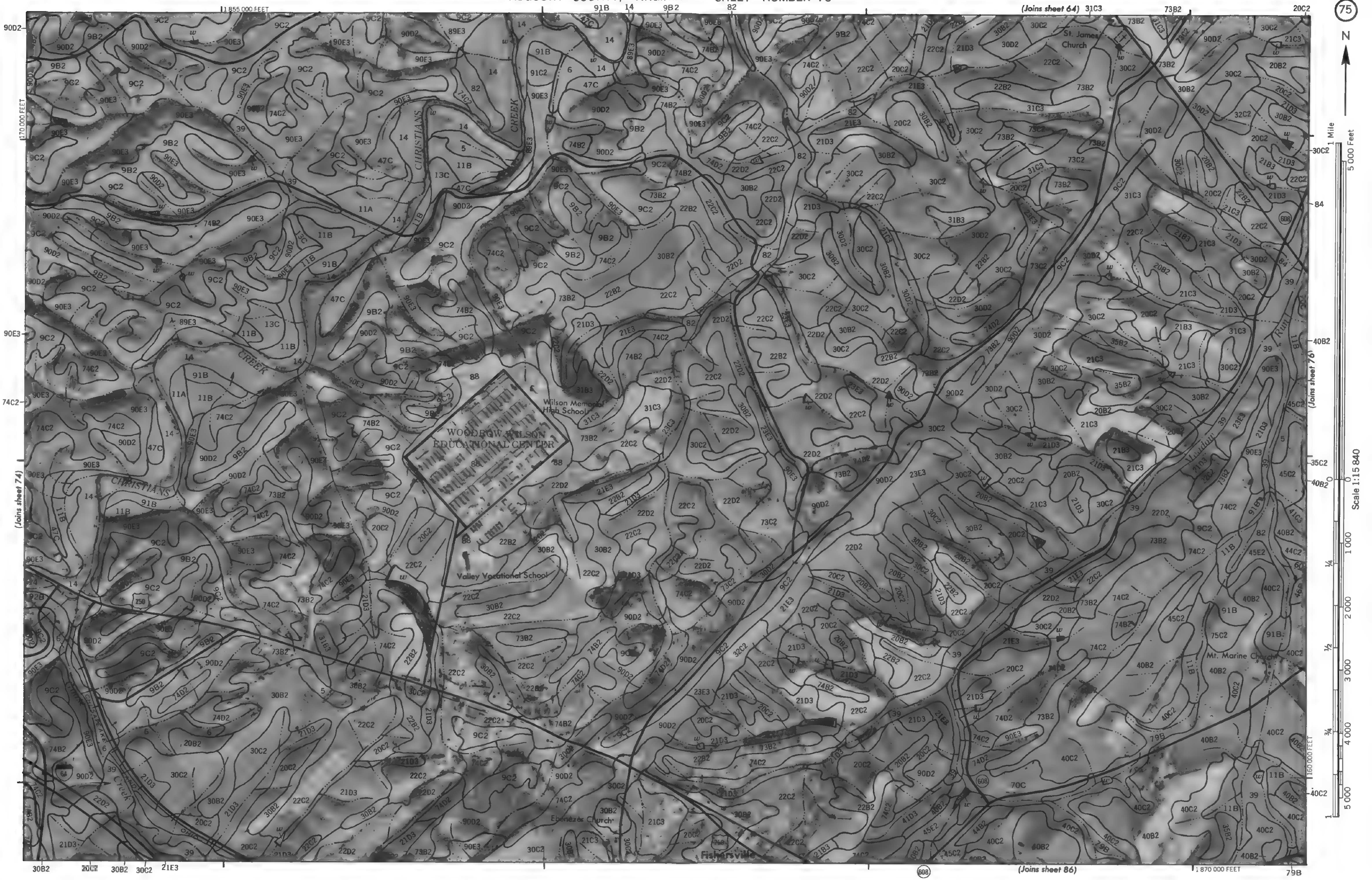
N



1 Mile
5 000 Feet
Scale 1:15 840
0 | 1 000 | 2 000 | 3 000 | 4 000 | 5 000
0 | ¼ | ½ | ¾ | 1

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

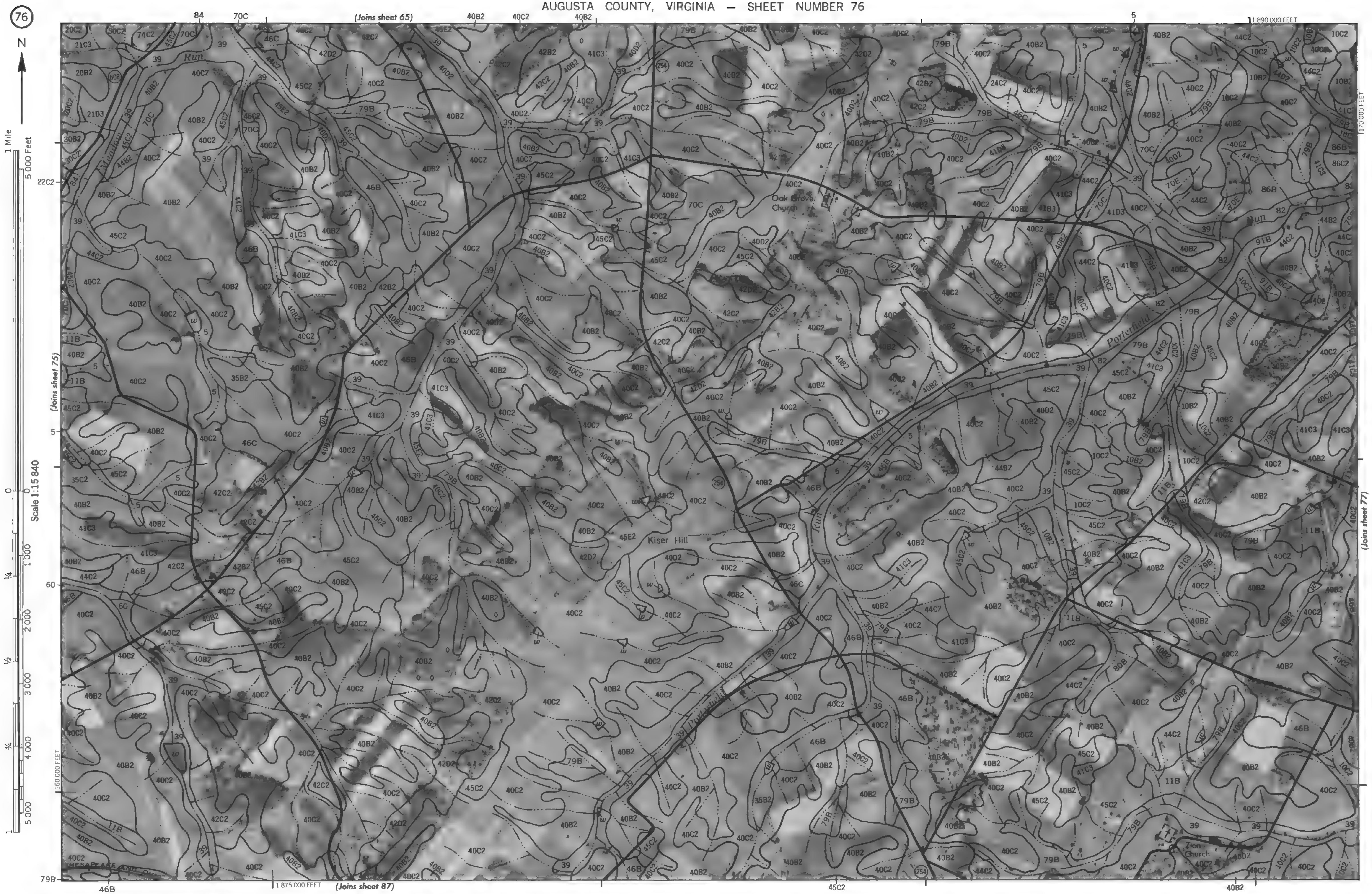
AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 75



AUGUSTA COUNTY, VIRGINIA NO. 75

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 76



This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA NO. 76

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 77

AUGUSTA COUNTY, VIRGINIA NO. 77

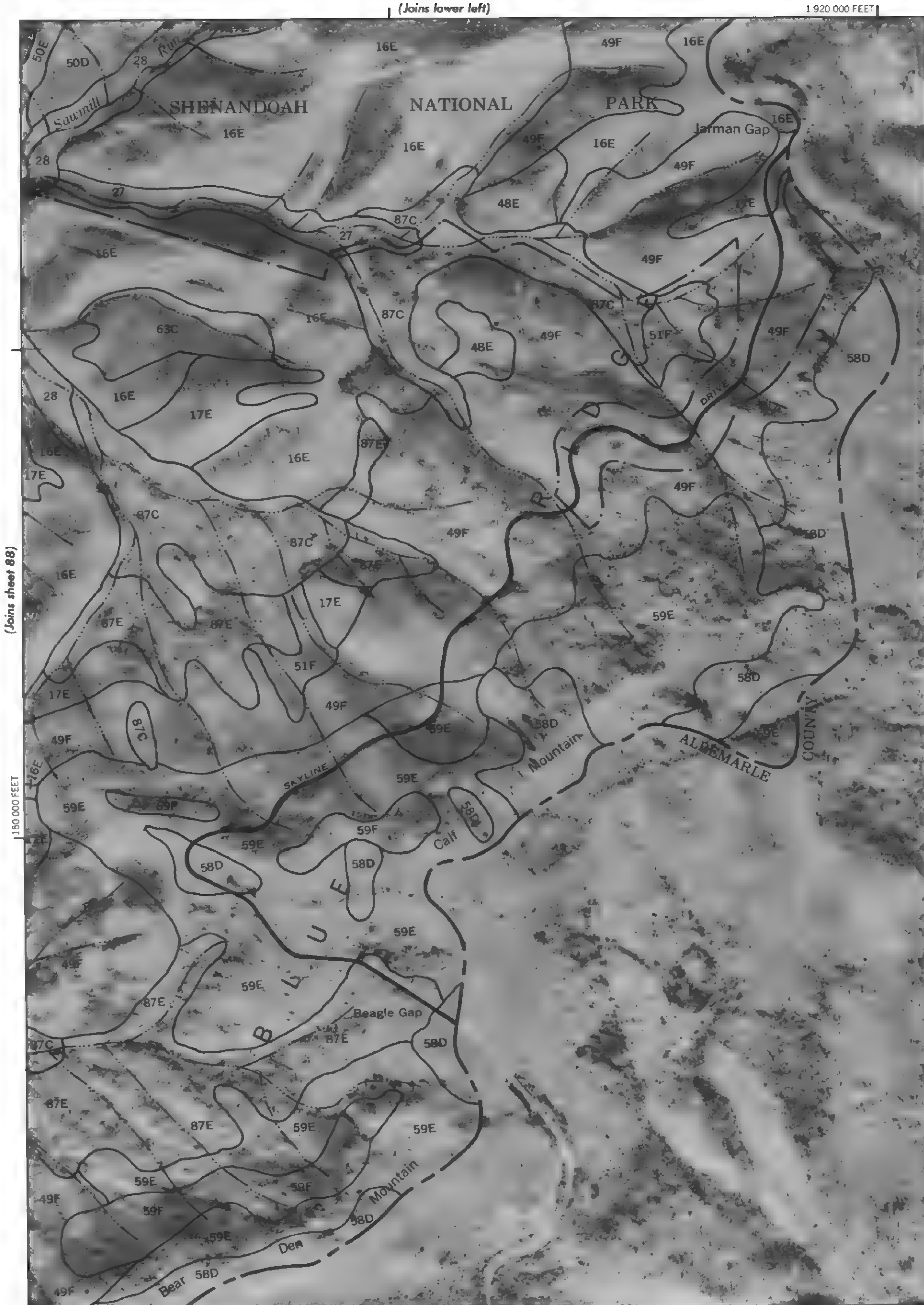
This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

Scale 1:15 840

1 Mile

5 000 Feet



This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA NO. 79

This map is [redacted] on 1957 and 1966 [redacted] photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 8

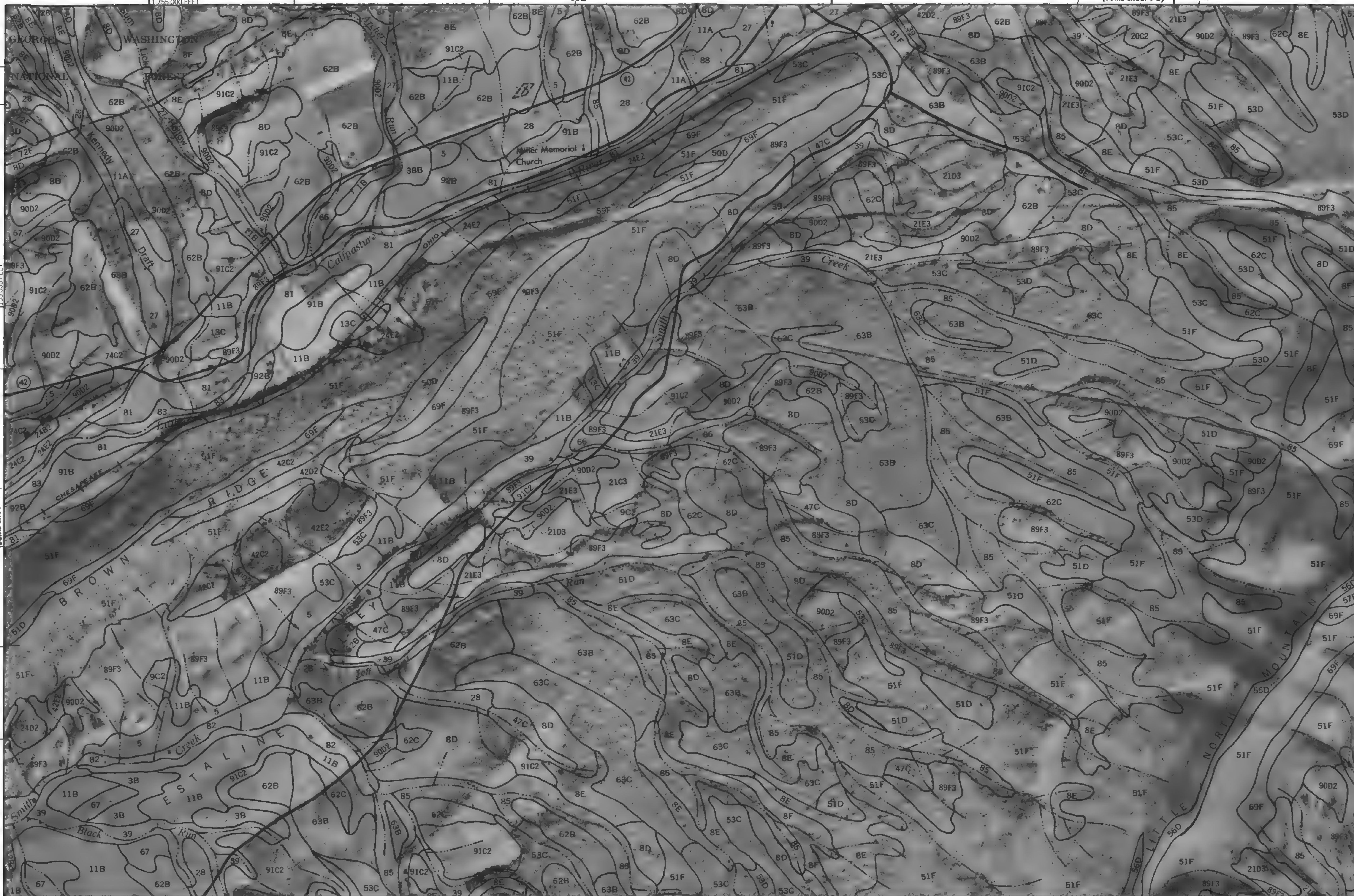
This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned

AUGUSTA COUNTY, VIRGINIA NO. 8

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 81

(81)



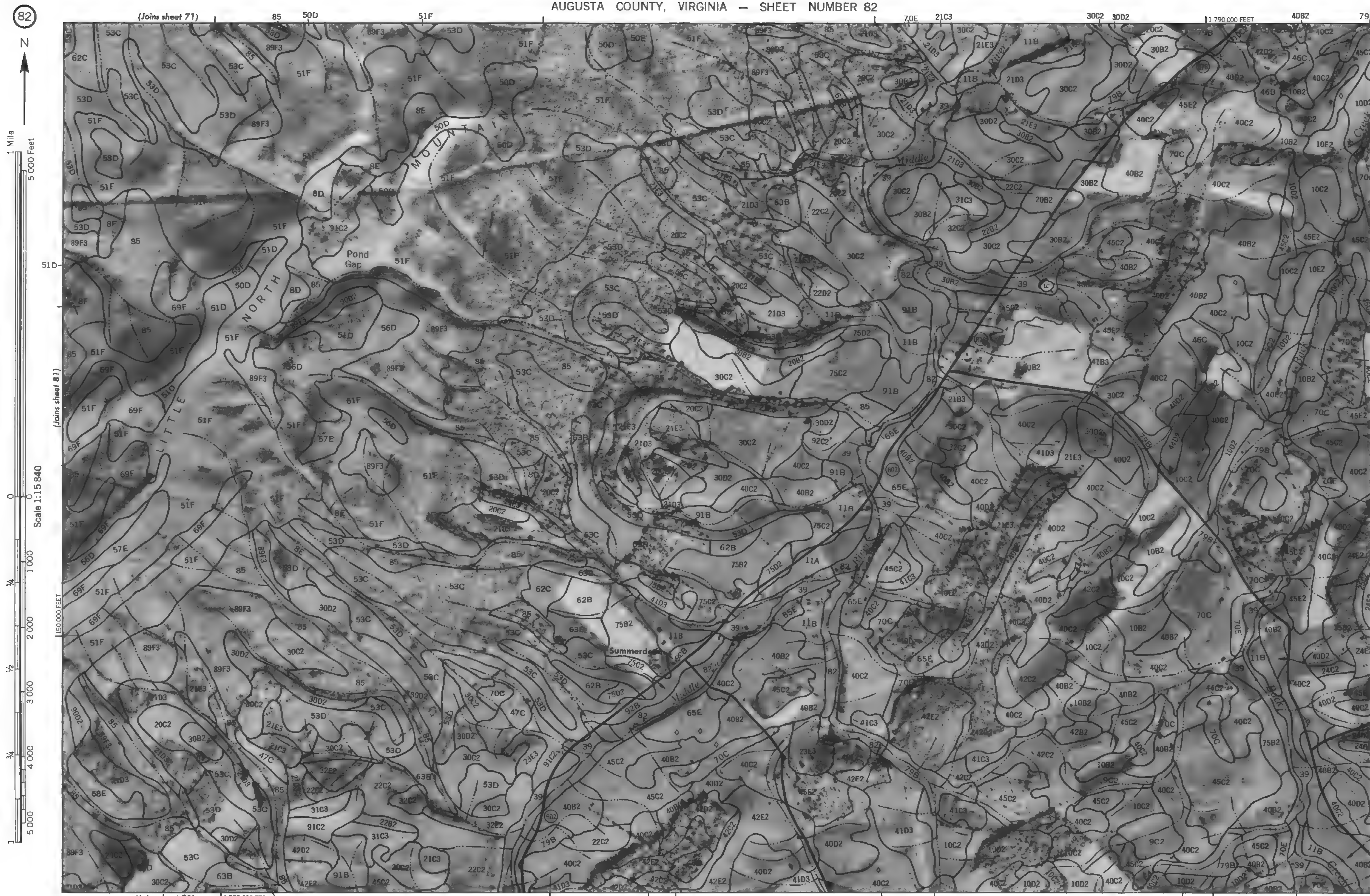
AUGUSTA COUNTY, VIRGINIA NO. 81

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 Mile | 5 000 Feet | Scale 1:15 840

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 82



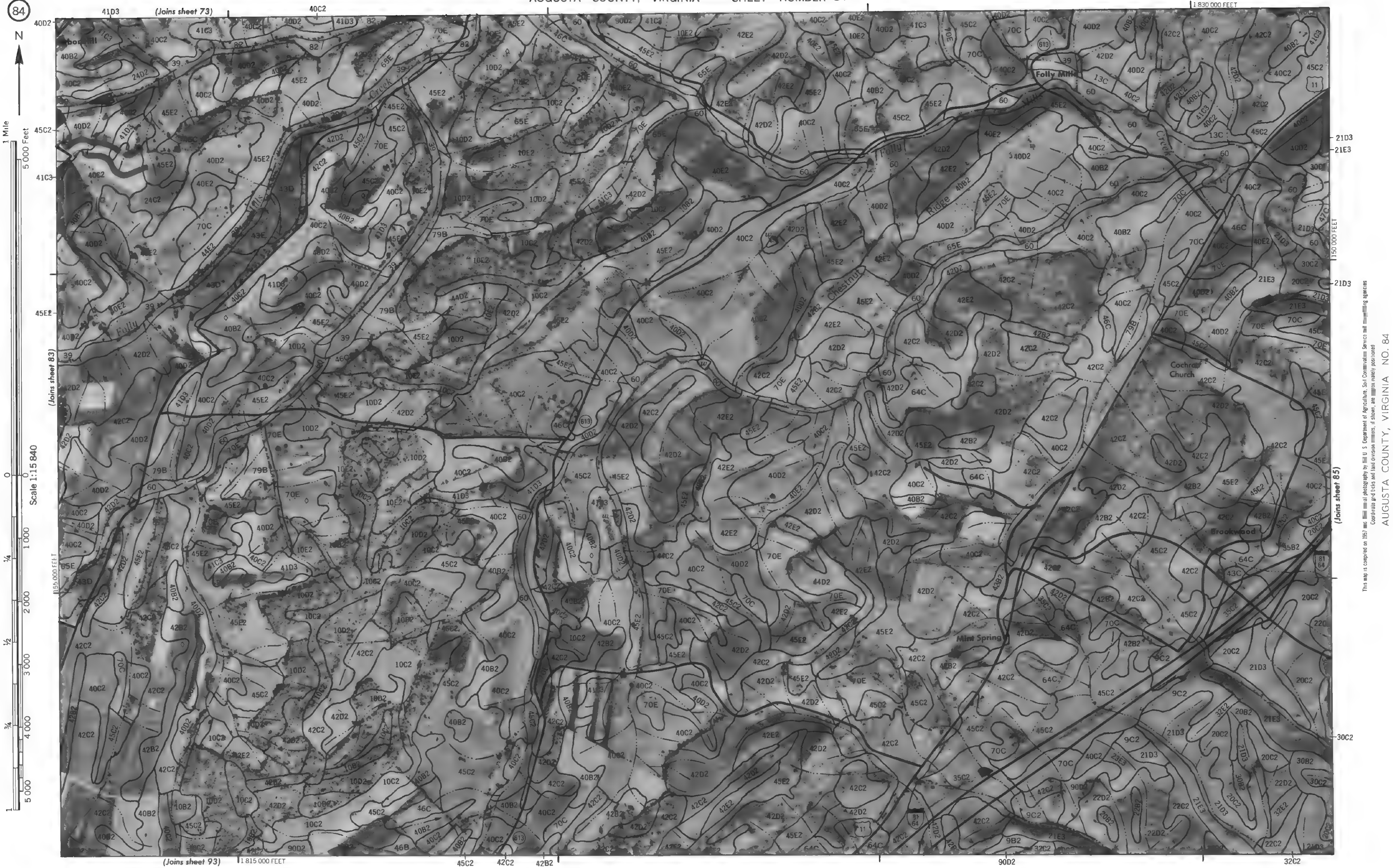
This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

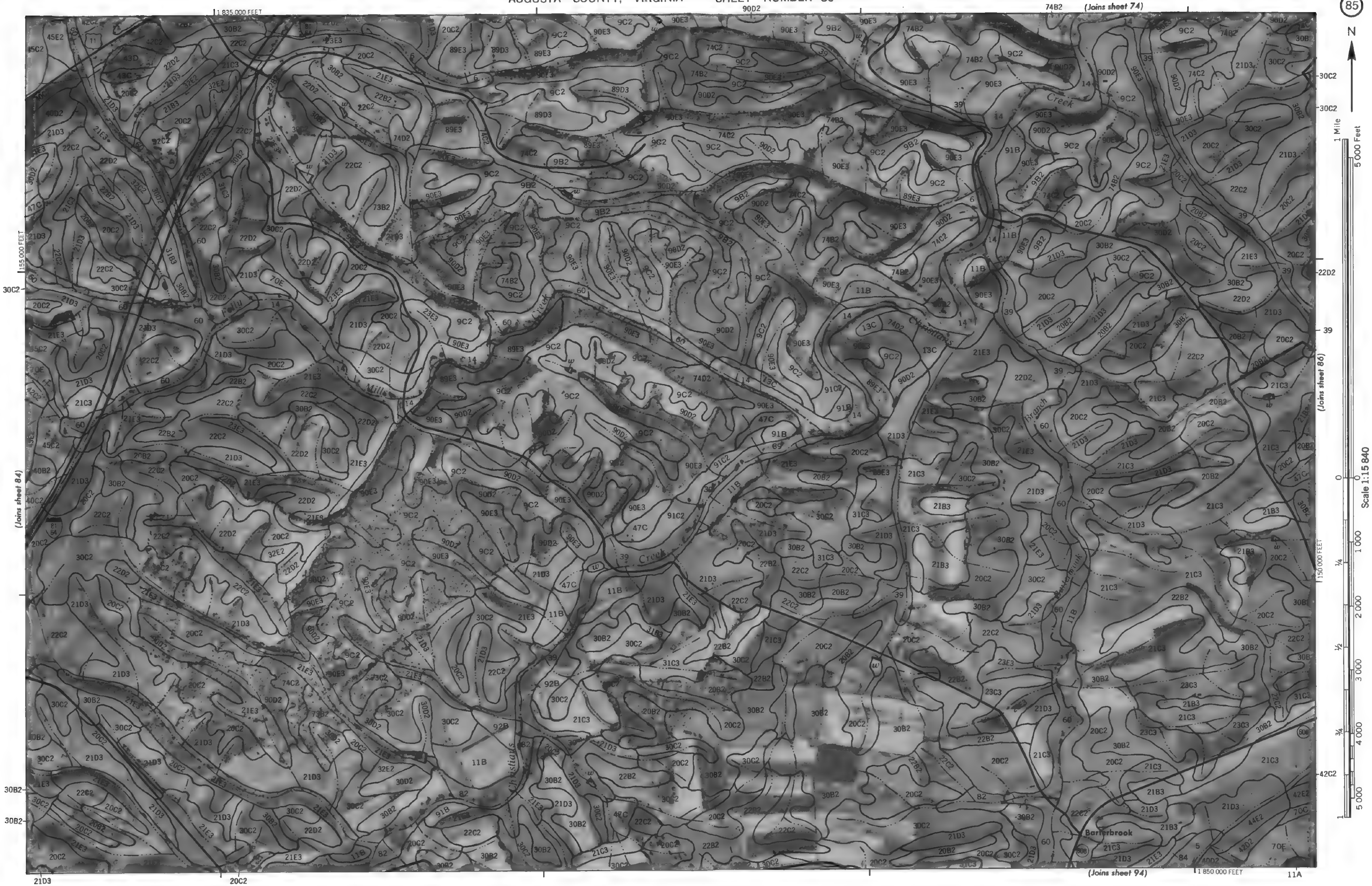
AUGUSTA COUNTY, VIRGINIA NO. 82

AUGUSTA COUNTY, VIRGINIA NO. 83

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 84

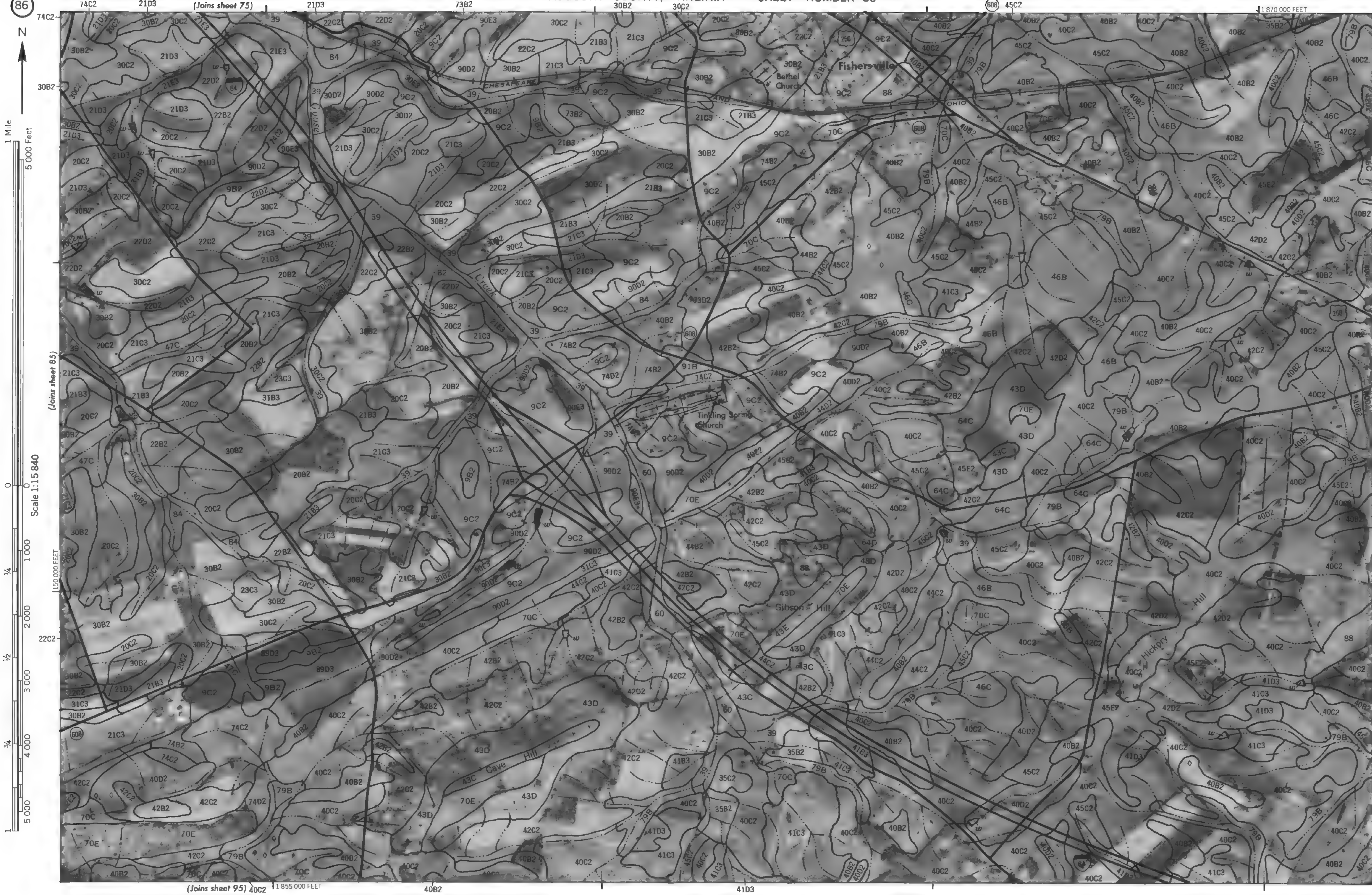




AUGUSTA COUNTY, VIRGINIA NO. 85

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 86



This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

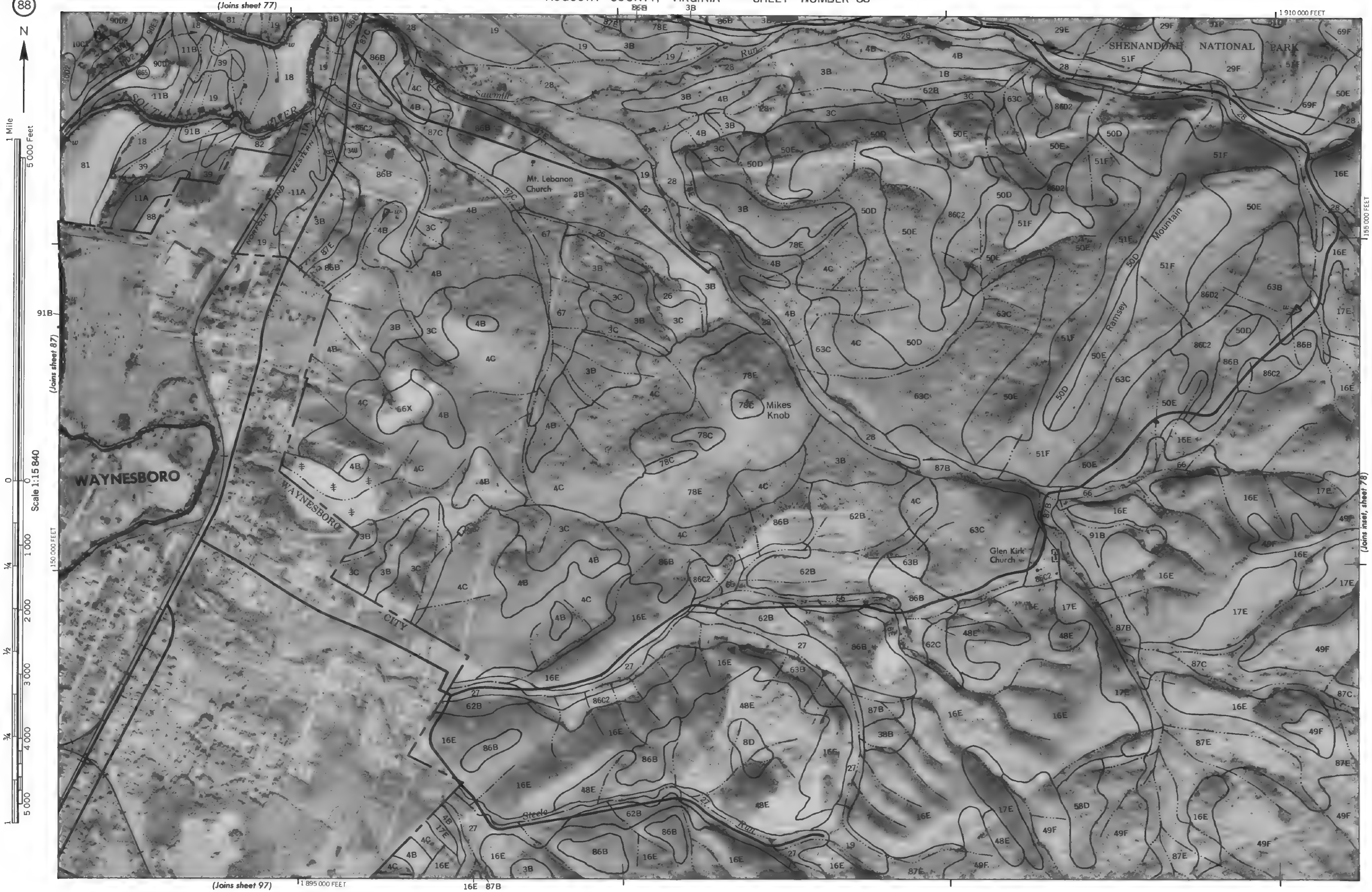
AUGUSTA COUNTY, VIRGINIA NO. 86

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 87

AUGUSTA COUNTY, VIRGINIA NO. 87

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 88



This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA NO. 88

89

AUGUSTA COUNTY, VIRGINIA NO. 89

This map is compiled on 1957 and 1956 aerial photography by the U. S. Department of Agriculture Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(Joins sheet 80)

(Joins inset, sheet 57)

(Joins sheet 90)

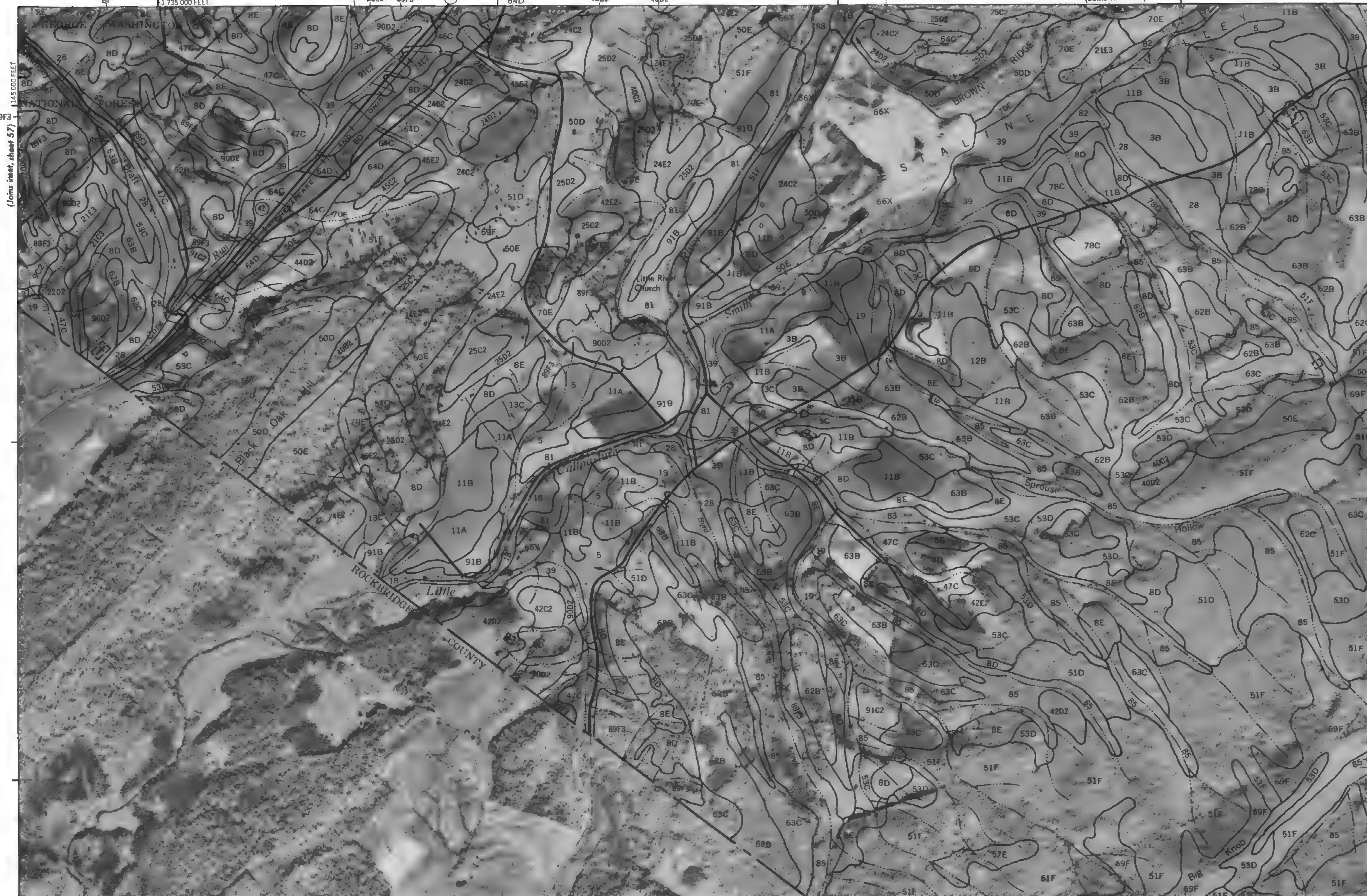
(Joins inset, sheet 105)

1 735 000 FEET

145 000 FEET

135 000 FEET

1 750 000 FEET



N

1 Mile

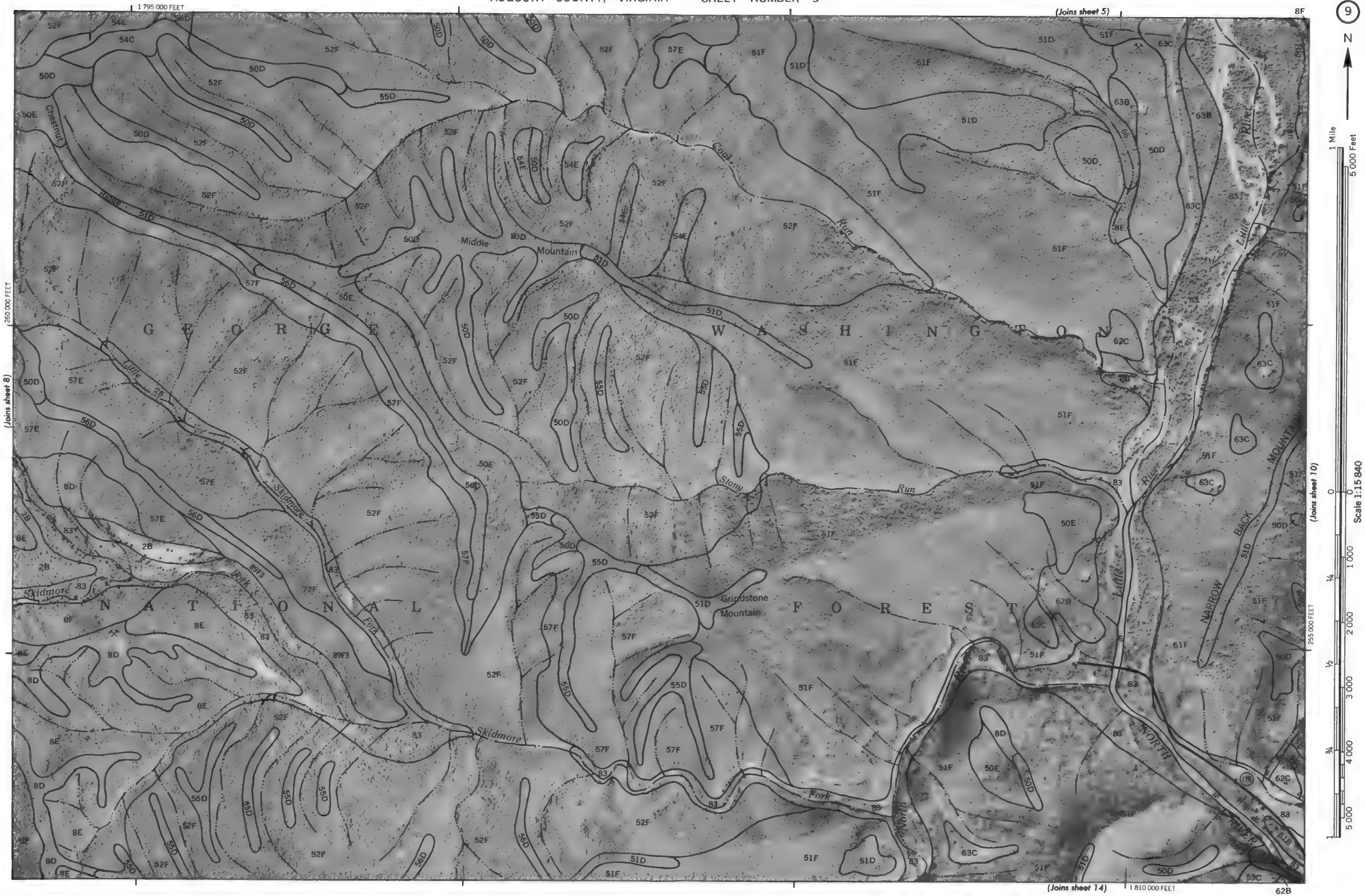
5 000 Feet

Scale 1:15 840

0 1000 2000 3000 4000 5000

0 1/4 1/2 3/4 1

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 9



AUGUSTA COUNTY, VIRGINIA NO. 9

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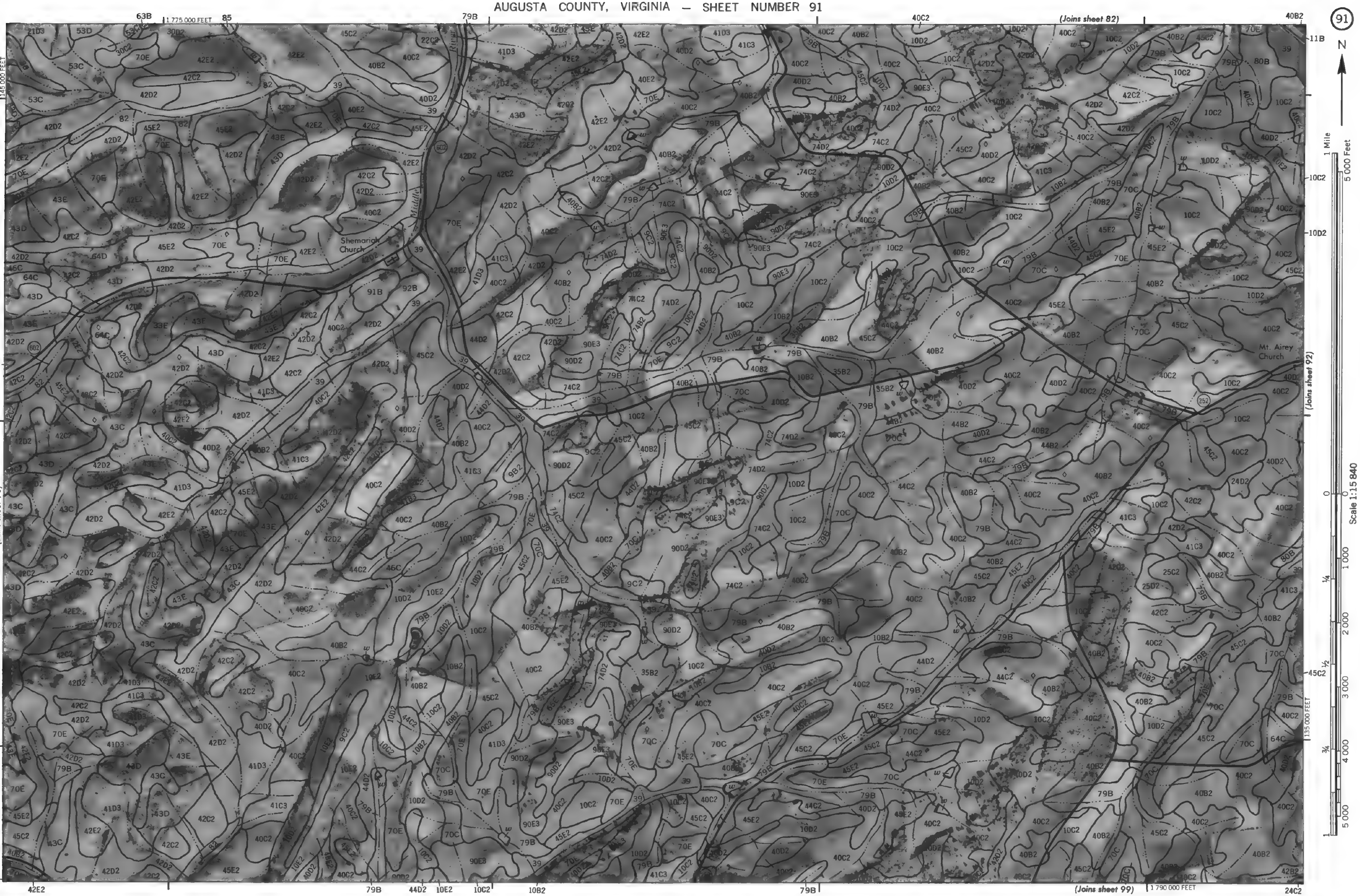
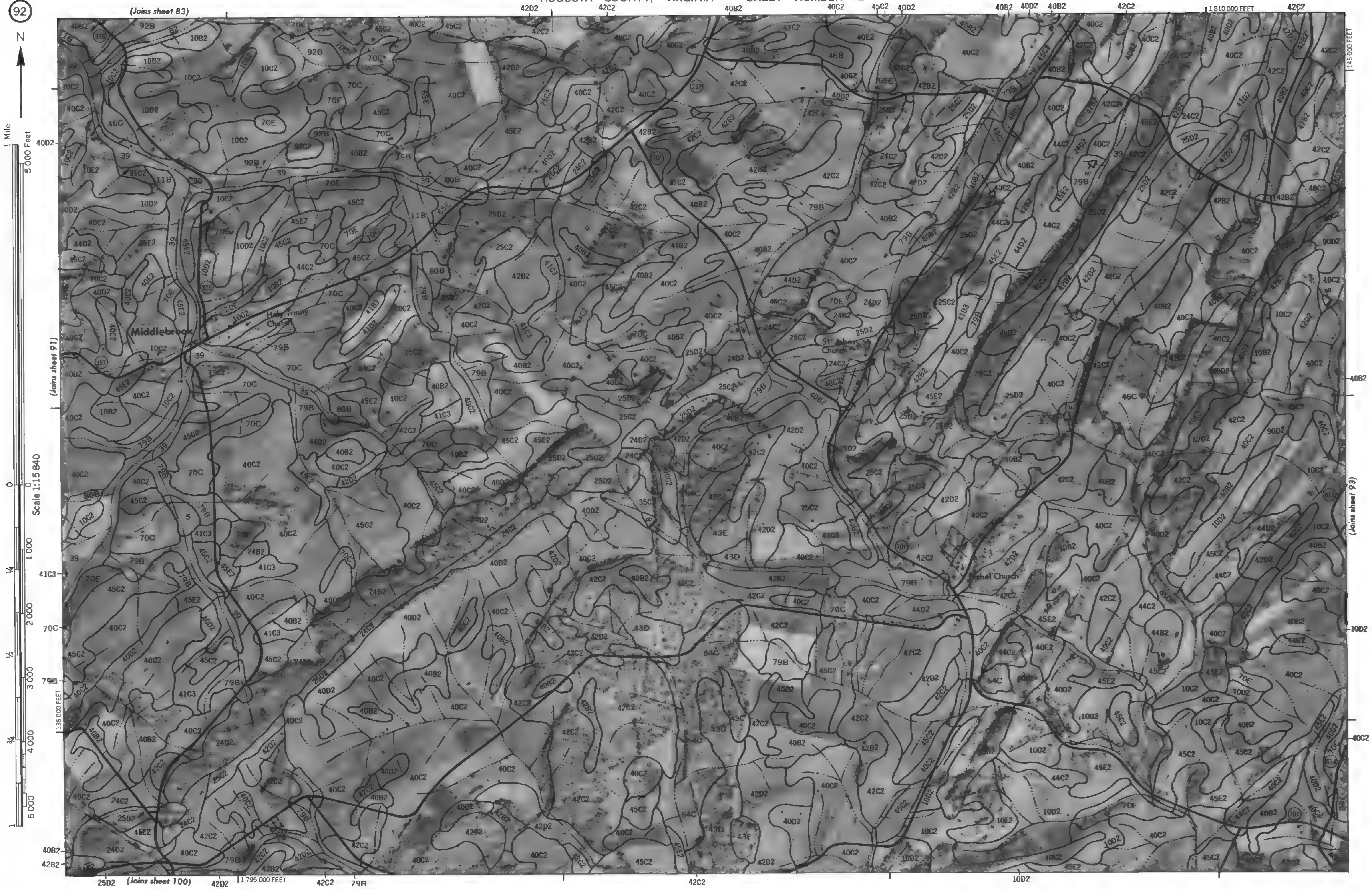
AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 91

AUGUSTA COUNTY, VIRGINIA NO. 91

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

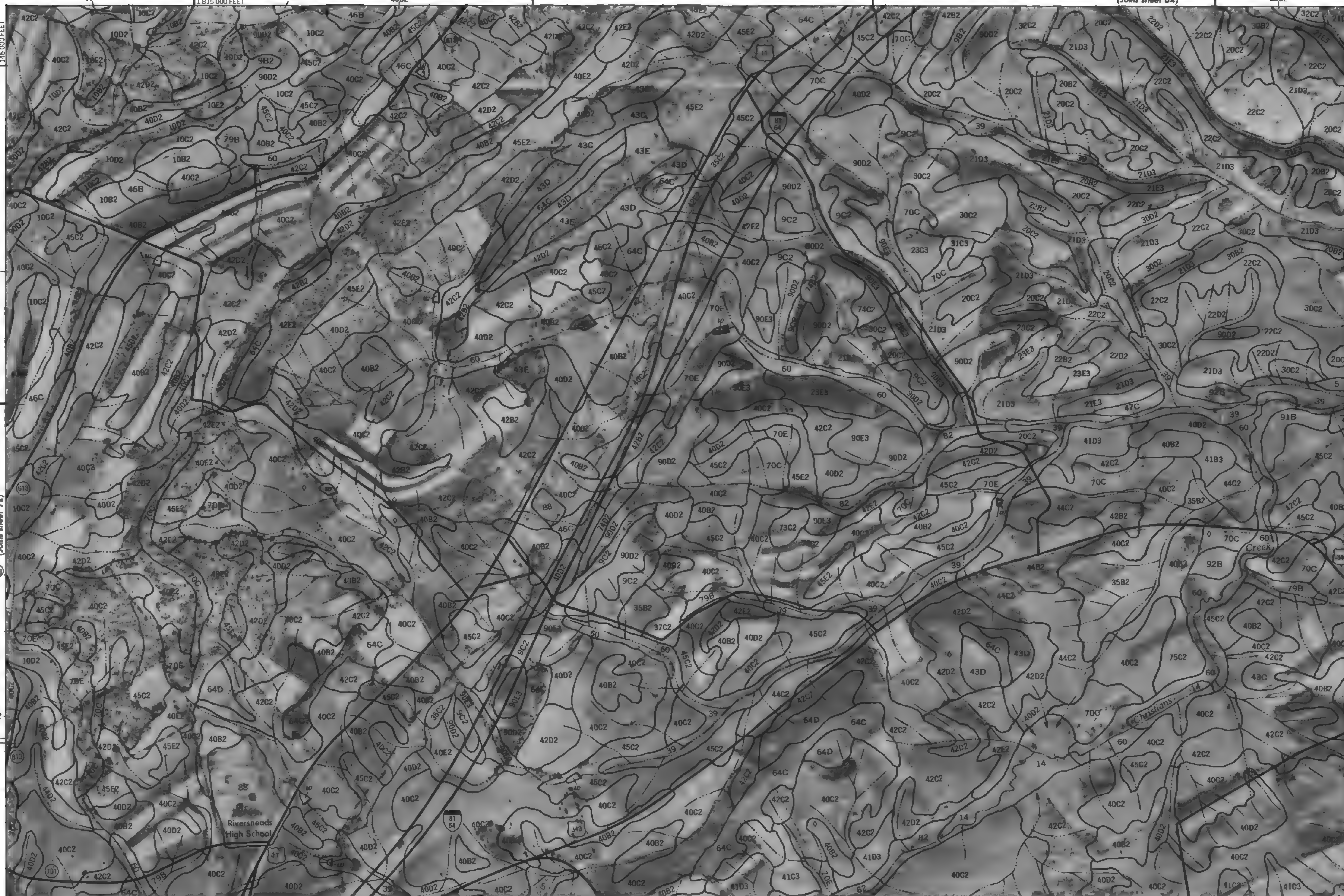


AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 92



This map is compiled on 1957 and 1956 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners, if shown, are approximately positioned

AUGUSTA COUNTY, VIRGINIA NO. 92



N

Scale 1:15 840

1 Mile
5 000 Feet

AUGUSTA COUNTY, VIRGINIA NO. 93

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 94

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA NO. 94

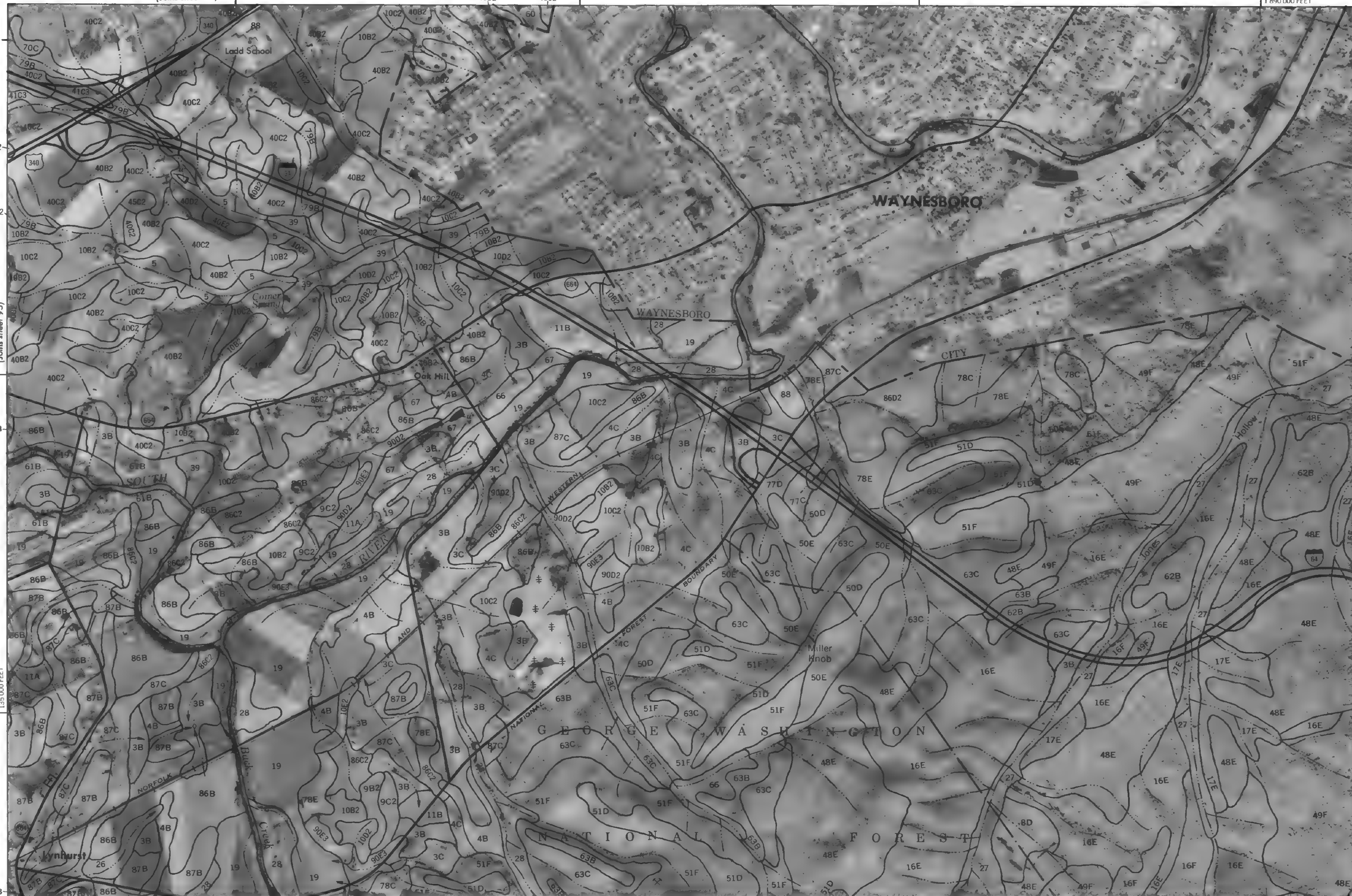
1 Mile
5 000 Feet
0
1000
2000
3000
4000
5000
¼
½
¾
1
Scale 1:15 840

AUGUSTA COUNTY, VIRGINIA NO. 95

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(Joins sheet 87)

1 890 000 FEET



(Joins sheet 95)

(Joins sheet 97)

145 000 FEET

135 000 FEET

(Joins sheet 104)

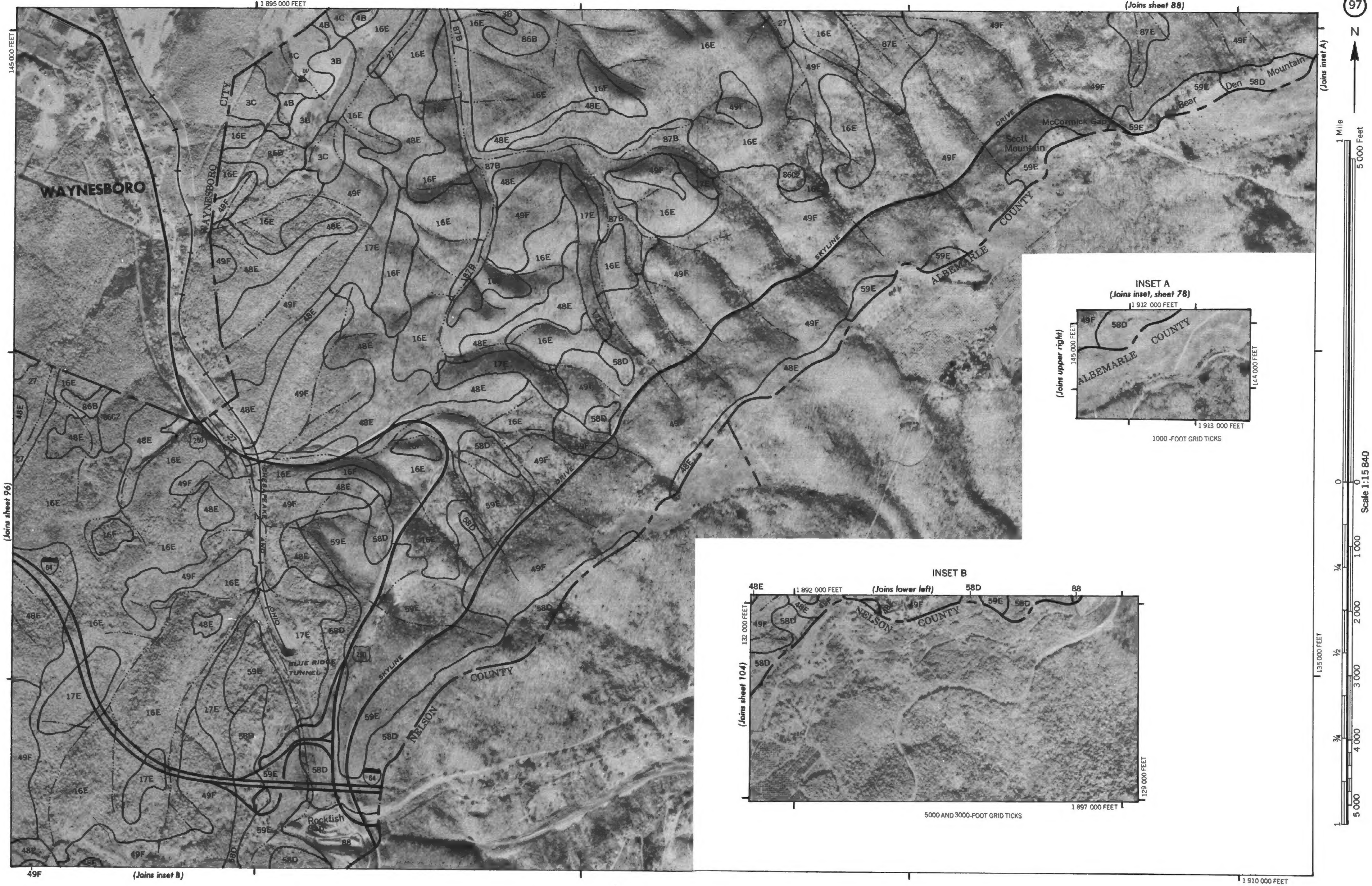
1 875 000 FEET

N

Scale 1:15 840

1 Mile — 5 000 Feet

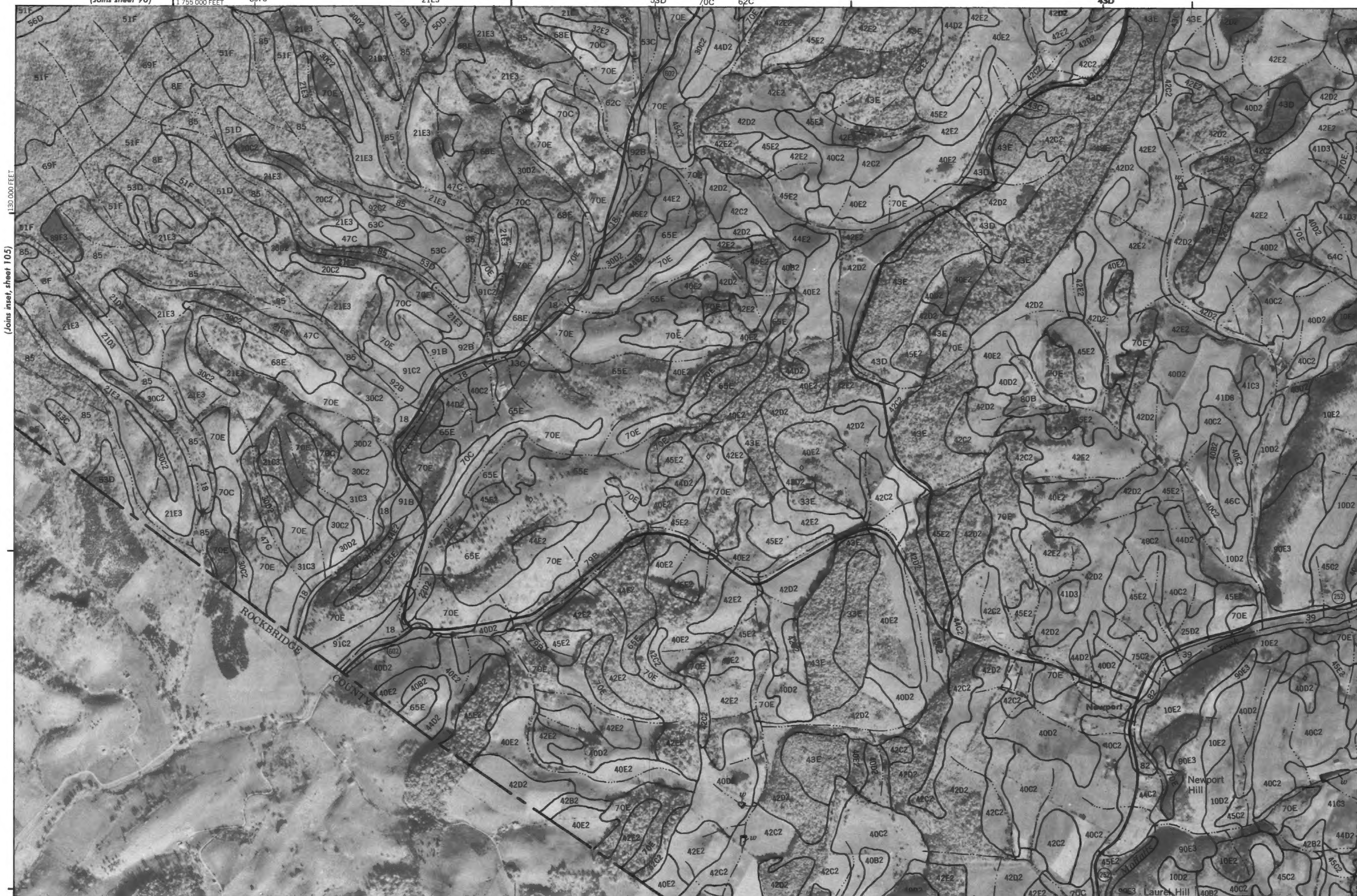
This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



AUGUSTA COUNTY, VIRGINIA NO. 97

This map is compiled on 1957 and 1956 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA — SHEET NUMBER 98



N

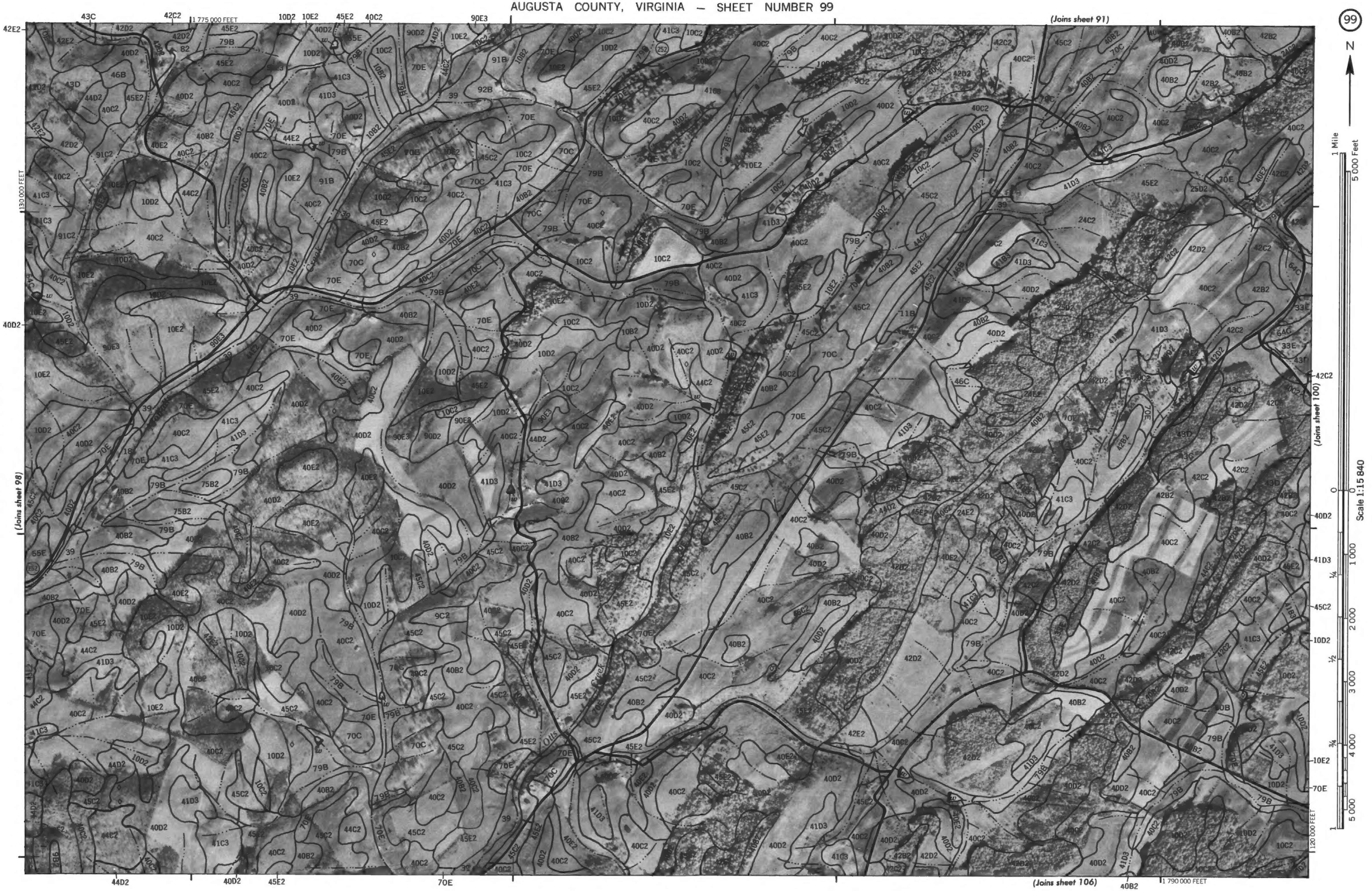
Scale 1:15 840

1 Mile

5 000 Feet

This map is compiled on 1957 and 1966 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

AUGUSTA COUNTY, VIRGINIA NO. 98



AUGUSTA COUNTY, VIRGINIA NO. 99

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AUGUSTA COUNTY, VIRGINIA

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool — Davis Airstrip; FLOOD POOL LINE

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEMS & DESIGNATIONS

- Interstate — 79
- Federal — 410
- State — 52
- County, farm or ranch — 378

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small — water; w

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — GAS
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water; w
- Intermittent — int; i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — CeA; FoB2

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown)

MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot
- Dump, trash